The American

GAS LIGHT JOURNAL.

(ILLUSTRATED.)

DEVOTED TO THE INTERESTS OF

ILLUMINATION, HEATING, MECHANICAL, CHEMICAL

AND

GENERAL SCIENCE.

LIBRARY OF CONGRESS.
JAN 4 1900
SMITHSONIAN DEPOSIT.

VOLUME LXXI.

(FORTY-FIRST YEAR.)

FROM JULY 1 TO DECEMBER 31, 1899.

A. M. CALLENDER & CO., Publishers.

OFFICE OF PUBLICATION, NO. 32 PINE STREET, NEW YORK CITY.

Part 1
1
1002
L.C
JUL 3 1899
41936

THE AMERICAN GAS LIGHT JOURNAL

REDMAN & KENNY, N.Y.

PUBLISHING OFFICE No. 32 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME LXX. No. 1 Whole No. 1,256. | NEW YORK, MONDAY, JULY 3, 1899. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager. THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 32 Pine Street, New York.

Collections are invariably made directly from this office for subscriptions, advertisements, etc. We have agents to solicit the same, but they are not authorized to receipt for money.

Terms of Subscription, Including Postage.—For the United States and Canada, $3 per annum. European countries, $4.50 (19 shillings—22½ francs). All payments to be made in advance. Single copies, 10 cents.

Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

Remittances should be made either by post office order, express money order, registered letter, or bank draft on New York, payable to the order of A. M. Callender & Co.

Books.—We will forward by express, at publisher's lowest rates, any book—scientific or otherwise—to any address in the United States or Canada. We would suggest to our patrons that to avoid the risk and expense consequent on sending us the money (we do not send books C. O. D.), that orders for books be sent us through the Purchasing Department of the American Express Company.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

CONTENTS.

An Asterisk (*) denotes an illustrated article.

OFFICIAL NOTICES—
Seventh Annual Meeting, Pacific Coast Gas Association..... 1
Special Committees, American Gas Light Association..... 1

EDITORIALS—
Briefly Told 1
Mr. A. G. Glasgow as a Lecturer—The Wrinkle Department, Pacific Coast Gas Association—Notes.

Proceedings, Twenty-second Annual Meeting of the Western Gas Association—Official Report—Revised by the Secretary—Continued from page 970 2
First Day, Morning Session—Discussing the Paper by Mr. Paul Doty, on The Causes Underlying the Formation of Naphthalene and Their Prevention—First Day, Afternoon Session—A Foundation that Failed and the Lesson it Taught, by Mr. B. E. Chollar—Discussion—Cyanides in the Gas and Waste Products at Columbus, O., by Mr. E. E. Eysenbach—Discussion—Five Questions from the Question Box—*Problems in New Business: Some History and Experiment, by Mr. F. B. Wheeler—Discussion.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES..... 14
Mr. W. H. Ward Resigns from Easton, Pa.—Progress at Lewiston, Me.—Contract for the Berlin Iron Bridge Company—Cheaper Gas for Burlington, N. J.—The Augusta (Ga.) Company Changes Hands—The Los Angeles (Cal.) Suburban Gas Company—The New Haven (Conn.) Company Sends a Check to the Firemen—Mr. Bailey Takes Charge at Seneca Falls, N. Y.—Contract for the U. G. I. Company—The Marblehead (Mass.) Company's Revised Schedule—The Revised Selling Schedule, Racine, Wis.—Changes in the Pekin (Ills.) Company—Proposed Company for Winston, N. C.—New Management, Raleigh, N. C.—The Standard Gas Company, New Brunswick, N. J.—The Spencer (Mass.) Company Reorganized—Annual Meeting, San Jose, Cal.—Hints from Hartford, Conn.—An Interesting Legal Decision—Cincinnati Dividend Cut—And Many Other Items.

The Market for Gas Securities 16

[OFFICIAL NOTICE.]

Seventh Annual Meeting, Pacific Coast Gas Association.

OFFICE OF THE SECRETARY, OAKLAND, CAL., June 7, 1899.

The seventh annual convention of the Pacific Coast Gas Association will be held in the city of San Francisco, Cal., on Tuesday and Wednesday, July 18th and 19th, 1899, commencing at 10 A.M. The meeting place will be the office of the San Francisco Gas and Electric Company, No. 413 Post street.

Papers will be contributed by:

"President's Address," by Mr. Charles F. Adams.
"Coal Combustion," by Mr. John L. Howard.
"Electrolytic Trials," by Mr. Wm. A. Aldrich.
"Gas Stoves, from Foundry to Consumer," by Mr. L. Kahn.
"Determinations," by Mr. J. B. Grimwood.
[Title to be announced], by Mr. Oscar B. Weber.
"Experiences," by Mr. F. H. Eichbaum.
"Historical Review," by Mr. W. M. Parker.
"Wrinkle Department," edited by Mr. G. H. Hollidge.
"Experience Department," edited by Mr. John Clements.

An excursion on the Bay of San Francisco, to the Union Iron Works, Mare Island and other points of interest, will be made on Thursday.

The Secretary will be in attendance at headquarters, No. 413 Post street, Tuesday, until 10 P.M., to meet members and afford information.

Queries for "Question Box" should be sent in prior to July 15th for assignment to members.

JOHN A. BRITTON, Secretary.

[OFFICIAL NOTICE.]

Special Committees, American Gas Light Association.

Mr. Alfred E. Forstall, Secretary of the American Gas Light Association, forwards us the following list of those appointed on the named special committees to act in connection with the next meeting of the Association:

Committee of Arrangements—Alten S. Miller (chairman), Wm. R. Beal, S. F. Hayward, J. H. Jourdan, J. M. Rusby; and Alex. C. Humphreys and A. E. Forstall, *ex-officio*.

Committee on Nominations—Irvin Butterworth (chairman), R. M. Dixon, K. M. Mitchell, F. C. Sherman and Wm. McDonald.

To Award the Beal Medal—Eugene Vanderpool (chairman), C. H. Nettleton and A. B. Slater.

Finance Committee—George G. Ramsdell (chairman), Rollin Norris and E. H. Jenkins.

BRIEFLY TOLD.

MR. A. G. GLASGOW AS A LECTURER.—The thirty-sixth annual meeting of the Incorporated Gas Institute was successfully carried through in London last month, the sessions having been held in Westminster Town Hall, Westminster, London, the 13th, 14th and 15th of June. The proceedings were capably directed by the President, Mr. Samuel Stewart, of Greenock, who was more than ably assisted by the Secre-

tary, Mr. Walter T. Dunn. The paper list was lengthy, and the contributors thereto were quite felicitous in the handling of their subjects, and it is good satisfaction to us to be able to say that the paper by the veteran of them all, Mr. Thomas Newbigging, of Manchester, on the topic of "Differential Rates, as between Consumers of Gas for Lighting and for Purposes other than Lighting," shows he has lost neither originality nor vigor. It is also worthy of comment that the first paper prize in the Institute gift was awarded to Mr. Sydney Y. Shoubridge, now of Sydenham, London, for the paper by him last year at the Belfast meeting, on the topic of "Inclined Retorts at Salford." American interest in this award mainly lies in the fact that it makes much justification for the course adopted by Mr. A. H. Barret, Engineer of the Louisville (Ky.) Gas Company, who, despite trials and tribulations of many kinds, will have the satisfaction in 1900 of knowing that, through and of him, the first working retort house in America on the inclined plan will be a fact. Judging from our other preliminary advices over the meeting of the Incorporated Gas Institute, it must be written down that its sessions were successful. The lecturer (Mr. A. G. Glasgow) this year before the Institute was a Virginian, and a partner of Mr. Alex. C. Humphreys, who, as all our readers know, is the President of the American Gas Light Association, and the two constitute the firm of Humphreys & Glasgow, of New York and London. With that understanding it was fair to assume that the lecturer would have chosen a theme which would have shown both water and coal gases in their true lights; but, unluckily for the common good of the gas trade the world over, Mr. Glasgow elected to preach on the theme as to whether exposure to water or to coal gas would do the exposed the most harm. It would have been bad enough had he confined himself to a chemical recounting of the differences between the two sorts of gases; but, apart from the effects of such differences, Mr. Glasgow managed to argue that in America the proportion of deaths from exposure to gas inhalation was out of the reckoning, compared with the proportion likely to occur from the same cause in England, simply from the mongrel nature of the population of our large American cities. By this time, Virginian though he is, one would have thought that Mr. Glasgow should, as a gas engineer, have remembered that gas is "made to burn, not to breathe," and that its development and spread are not altogether dependent on whether sales of coal gas or of water gas apparatus are made. In fact it is too bad that Mr. Glasgow's personal zeal should have caused him to forget, and before a British audience, that gas of any sort has fewer dangers than those which lurk in other means of lighting supplied from central stations.

THE WRINKLE DEPARTMENT, PACIFIC COAST GAS ASSOCIATION.—When Mr. George H. Hollidge, Superintendent of the Merced (Cal.) Gas and Electric Light Company, was named last year to take charge of the editing of its Wrinkle Department for the Seventh Annual Meeting, he did so with the complete understanding that the members would assist him to make his labors as light as possible by their active support. Wrinkles this year with the Coast folks have not been as many as their brows carry, and Editor Hollidge earnestly requests that those who have lagged will lag no longer. Send your rough sketches to him forthwith, so that President Adams and Secretary Britton may not say that Editor Hollidge was neglectful of his work; but neither of them could even think such was the case.

NOTES.—The last edition of Field's "Analysis of the Accounts of the Principal Gas Undertakings of England, Scotland and Ireland," which has to do with those accounts for 1898, is now on sale. The book may be ordered through A. M. Callender & Co.——Mr. W. E. Moon, writing under date of June 27th, says that the Augusta (Ga.) Railway and Electric Company has purchased the Gas Light Company of Augusta, and will in future operate the same. Other references to this will be found in our current item columns.——Is it not time that somebody told Mr. F. S. Hastings, President of the Indianapolis (Ind.) Gas Company, that "Silence is golden?"——Governor Wolcott has re appointed Mr. Morris Schaff, of Pittsfield, for another term on the Massachusetts Board of Gas and Electric Light Commissioners.——Manager Starr, of the Wallingford (Conn.) Gas Company, reports a good demand there for gas cooking appliances.——The proposition to establish a municipal plant in Buffalo, N. Y., still languishes, although the authorities do not lack for offers of available sites.——The strike at the Denver (Col.) works was of short duration.——The American Gas Company, in connection with its properties in Mount Vernon and New Rochelle, N. Y., will more than likely hold its own in the contest now on between it and the Westchester Gas and Coke Company.

[OFFICIAL REPORT—REVISED BY THE SECRETARY—CONTINUED FROM PAGE 970.]

PROCEEDINGS, TWENTY-SECOND ANNUAL MEETING, WESTERN GAS ASSOCIATION.

HELD AT HOTEL PFISTER, MILWAUKEE, WIS, JUNE 14, 15 AND 16, 1899.

FIRST DAY, WEDNESDAY, JUNE 14—MORNING SESSION.

Discussing the Paper[1] by Mr. Paul Doty, on The Causes Underlying the Formation of Naphthalene and their Prevention.

The President—This carefully prepared and very able paper is now before the Association for discussion. As I am sure many others here have had experience with naphthalene, the discussion will be very valuable to all of us, if taken part in freely.

Mr. Witherby—Has Mr. Doty ever obtained any product from the Standard Oil Company which proved reliable as a solvent at all times. In other words, is any free naphtha procurable which always works the same?

Mr. Doty—No.

Mr. Witherby—I put in an apparatus at the Lockport (N. Y.) works at a time when we were making some changes in the piping. It was a very easy matter to place the apparatus in a corner where we could readily observe its operation. For the first three days of its operation the naphthalene deposit was brought down from interior walls of the atmospheric condenser in such a rapid manner that all the drip pipes were stopped up, and gave us an immense amount of trouble for those three days. After that the naphthalene trouble ceased entirely from one end of the works to the other, and the little that showed on the oxide after taking it out was very much smaller in amount and of less frequency. On the inside of the main, at the purifying boxes, and more particularly at the inlet and outlet of the station meters, the interior of the pipes had the same appearance that you would observe from just taking a brush and wiping that naphthalene out from the inside of a pipe, leaving it free, but of an oily nature. These good results continued just as long as we had that particular grade of naphtha. But as the minimum price paid the Standard Oil Company for this particular grade of naphtha changed we used another grade, with the result that in about four days all our troubles came back and were apparently worse than ever before. We found naphthalene crystals deposited at the very outlet of the drip pipes, and under the drip pipes it would pile right up, practically closing everything. Although it gave us directly opposite results, it was said to be the same kind of naphtha and it was used precisely under the same conditions. Whether it was due to the change from one to the other, or as to what caused the return of the trouble, I am unable to state.

Mr. Doty—It may be that in the second case the gas had been so thoroughly saturated with naphthalene that it would not absorb any more.

Mr. Witherby—I believe the 63° naphtha was the best to use for that purpose, for as long as we used the Standard Oil Company's 63° grade we had no trouble; but as soon as we changed to another make the trouble came back in three or four days, and even worse than before.

Mr. Doty—What was the temperature of the naphtha as you introduced it?

Mr. Witherby—About 134° to 136°. It was just at the outlet of the P. & A. condenser. This was entirely on coal gas. I will state that we ran it through the heater in such a manner on the old plates, where the water used to drop from one plate to another, the gas went with an upward motion through it, and the gasoline or naphtha was dropped on top of the plate, and was supposed to work downward. The results were remarkable for cleaning out the inside of the mains and helping along the purifying boxes. Our purifying boxes in that case were very small, while the tax on their capacity was great, thus giving us lots of trouble. We were sometimes obliged to change four boxes inside of 24 hours. I think that is trouble enough for almost any company. But as to getting uniformity in results—it all comes back to the one question of getting uniform naphtha to start with—a thing which up to this time I have been unable to secure.

Mr. Gimper—It can be said at the outset, and it is admitted by all of us, that we cannot make either coal gas or water gas without producing naphthalene. In his paper Dr. Eitner does not say he confirms the rule which experience has taught that abundant condensation is the best means of avoiding naphthalene stoppages. Of course, we all want to retain naphthalene in our gas. By condensation, in this

1 See JOURNAL, *ante*, p. 967.

sense, I take it he means that he removes the naphthalene. He gets it out in his condensation. But I should call this a mistake on the face of it. If we heat naphthalene in the gas throughout our works, and in our pipes, we must be sure that naphthalene will be deposited there. In my experience, adding gasoline to the gas at the outlet from the governor has given the most benefit in removing naphthalene troubles throughout our works. But I cannot say that good condensation will prevent naphthalene. When we use naphtha, or whatever we may use throughout our works, we simply remove the obstruction which we have caused, and then we go right on again and make the same obstruction afterwards. Naphthalene is the only substance in gas which can crystallize. By adding the vapors we simply try to carry in solution naphthalene and prevent its crystallization. By the high heats used to-day we do undoubtedly form more naphthalene than we did 30 years ago. When we were satisfied with a yield of 3¼ to 4 feet per pound of coal we did not hear anything about naphthalene troubles anywhere. The oldest gas men in this Association will tell you that in those days they knew nothing about naphthalene. But we do know about it now. In the earlier days we simply carried off the light oils, allowing them to remain in the gas, and this kept the naphthalene in suspension. That is my theory, and it is the result of my experience.

Mr. Odiorne—I would like to ask Mr. Gimper just how he introduced naphtha into the pipes.

Mr. Gimper—At the outlet.

Mr. Odiorne—Under pressure?

Mr. Gimper—No; simply under gravitation. We introduced it in the main on top of the inlet, for naphtha.

Mr. Doty—I believe, generally speaking, that gas naphtha at a temperature of 50° F. will not absorb naphthalene at all.

Mr. Gimper—In our gas we always used naphtha, and always removed the naphthalene from it.

Mr. Doty—At what temperature?

Mr. Gimper—At the ordinary temperature.

Mr. Doty—At 160° F.?

Mr. Gimper—No; at a lower temperature. But in works where the stoppages may be large we use steam with it.

Mr. Doty—In our experiments, at 50° F. we obtain more naphthalene from the gas naphtha than we put into the liquid. That is, if we put in 50 per cent. by weight of naphthalene in solution at 110° F., and then reduced the temperature to 50° F., and weighed the naphthalene deposited, we found more naphthalene than we had put in.

Mr. Gimper—I do not believe that gasoline introduced into the works and allowed to pass through the scrubbers and purifiers and into the holders will prevent naphthalene stoppages, because the tar coating which is in the inside of our pipes will absorb the gasoline again, and we simply pump it out at our drips.

Mr. Runner—We have had some little experience with naphthalene which may be of interest. A year or two ago we made some changes in our works, putting in full-depth benches, and our naphthalene trouble then commenced. My first attempt in handling it was in putting in an apparatus to employ benzine, benzole or gasoline, using a steam coil in the tank to raise it to a high temperature and vaporize it. We passed sufficient gas through this tank, by-passing the governor, to carry from three to four gallons of naphtha with every 20,000 feet of gas. As long as we did that we had no naphthalene trouble in any part of the main, but inside of 24 hours after we stopped we were blocked. As to the condensation to which Mr. Gimper refers, I think it very necessary to have gas condensed at certain temperatures in order to retain the naphthaline properties in it. A year ago, while trying to get rid of the constant expense of injecting benzine into the gas, we added to our condenser a new scrubbing apparatus, put thermometers at each outlet, and had the temperature frequently taken at those points. We found that as long as the temperature was maintained at a certain point we had no trouble from naphthalene, but if not constantly watched and kept at those points it would show traces at once. Before putting in the additional scrubber and condensing plant we kept four men busy on the street with benzine cans keeping the naphthalene trouble down so as to give any kind of service at all; but as soon as we introduced those improvements in our condensing and scrubbing outfit we no longer had any naphthalene troubles, although it covered the period of the year when we had the most severe strain on the works.

The Secretary—At what temperature of the gas did you find the naphthalene troubles disappear?

Mr. Runner—We have an air condenser, washer, multitubular condenser and another washer. If the gas was allowed to pass through the multitubular condenser at too high a temperature we were sure to have naphthalene troubles; but if we kept the temperature at from 60° to 65°, we have no trouble at all. If we allow it to run up to 68° or 70° or 72° we are sure to see traces of naphthalene.

The President—We would like to hear from Mr. Barthold the results of his experience.

Mr. Barthold—When admitting uncarbureted water gas into the retorts of three benches of the seven in operation, to the extent of 2 per cent. of the total gas made, there was a decrease of 3.5 candle feet, or about .7 candle; with 3 per cent. a decrease of 6.1 candle feet, or about 1.2 candle; with 7.2 per cent. a decrease of 8 candle feet, or about 1.6 candles. With 5 per cent. of carbureted water gas there was a decrease of 1.7 candle feet or .34 candle, and with 5.3 per cent. coal gas from the scrubber outlet a decrease of 1.5 candle feet, or .3 candle. The three benches were on one section of the hydraulic main. While admitting water gas into these benches the crude gas was tested for ammonia, samples being taken from the foul main close to the hydraulic main outlet. An average of six tests of the coal gas at this point gave 2,933 grains of ammonia per 1,000 feet. An average of four tests with about 10.5 per cent. of uncarbureted water gas gave 2,776 grains per 1,000 feet. An average of four tests with about 12.5 per cent. carbureted water gas, gave 2,699 grains per 1,000 feet. The results corrected for 100 per cent. coal gas give: Coal gas, 2,933 grains per 1,000; with 10.5 per cent. uncarbureted water gas, 3,102 grains per 1,000; with 12.5 per cent. carbureted water gas, 3,084 grains per 1,000, which shows a slight increase from the admission of water gas.

Constituents.	1.	2.	3.
Benzene vapor.....	1.2	.8	.7
Heavy hydrocarbons..	3.2	3.0	3.2
Carbonic oxide.....	8.9	9.5	9.3
Hydrogen.....	46.6	47.3	47.4
Marsh gas	31.7	30.9	32.0
Carbonic acid.....	1.3	1.4	1.4
Oxygen.....	.5	.5	.4
Residue.....	6.4	6.6	5.6
	100.0	100.0	100.0

(1) With coal gas, yield 5.14, candle power 16.4; (2) with 5.1 per cent. uncarbureted water gas, yield 5.1, candle power 15.4; (3) with 5 per cent. carbureted water gas, yield 5.05, candle power 16.3.

The President—Has Mr. Slater something to offer us on this subject?

Mr. H. C. Slater—I cannot say anything especial on this subject. As far as I know in Milwaukee we have had no trouble in the street and none in the works, except in two instances: Once in the connections to one of the station meters, and the other in the inlet to one of the holders. The naphthalene is pretty much all taken out of the gas in our condensers. The temperature of the outlet of the condenser is about 70° F. I have had no trouble with naphthalene except in taking it out of the condensers.

The President—Has Mr. Mitchell anything to say on this subject?

Mr. Mitchell—I do not know that I have anything new to say. It has been our practice to try to keep in the gas as much of the light oils as possible, and in that way dissolve and carry along the naphthalene. Naphthalene is a very valuable illuminant, and it is our object to carry it along if possible to the burners. We are working along that line now; we expect at some meeting of the Association to show how we do it. We are getting pretty good results and are not having much trouble with naphthalene in our present apparatus; but we have not yet run it long enough to be positive of the results.

The President—At the time you read your paper before the American Association you thought the Shadbolt method a sure prevention, did you not?

Mr. Mitchell—There is no question but that method did work well with us while running on coal gas; but after we put in operation our new water gas apparatus we were unable to get the same results. We just simply quit, closed the valves, and the apparatus is standing there yet. While making coal gas there is no question but that it did the work. The gas partially purified on being caused to return would take up some of the lighter oils or benzoles of the coal tar and carry them along, and they would act as solvents for the naphthalene and carry it to the burners. There is no question but that the Shadbolt process did work well with us. We had been so bothered with naphthalene that it sometimes took four or five barrels of gasoline every 24 hours to get the holder inlet clean, so we could get the gas into the holder. By means of the Shadbolt process we stopped all use of gasoline.

Mr. H. C. Slater—With reference to the use of naphtha or light oils to carry the naphthalene along. Has anyone made any tests to show that naphthalene is carried to the burners? Or is the naphthalene condensed and pumped out in solution at the drips?

Mr. Odiorne—I would like to ask Mr. Doty if naphthalene is more apt to cause difficulty and bother at certain times of the year, or at one time more than at another?

Mr. Doty—Unquestionably, for temperature is a very important factor.

Mr. Odiorne—At what time of the year did Mr. Doty have the most trouble?

Mr. Doty—At the changes of the seasons; particularly at the change from summer to fall. But just when or where you are going to get it no one knows.

Mr. Chollar—I think we might ascribe a good deal of the trouble with naphthalene to its very high molecular weight which carries with it very low specific heat. The vapor of naphthalene would weigh, per volume, I would say, 64, as against an equal volume of air, at about 14; and a very slight increase of heat will change it from a solid to a vapor. In that respect it is like camphor, which takes the form of vapor directly from the solid. Therefore, about the only practicable way to control it is to keep it in solution with some other vapor.

Mr. Mitchell—Does Mr. Chollar believe that it can be carried along to the burner?

Mr. Chollar—Undoubtedly.

Mr. McClary—I may be able to add a word concerning the probability of the naphthalene being carried forward and consumed at the burner. The Ogden Gas Company, Chicago, had some trouble from naphthalene in services last Fall. We were getting our oil from the Standard Oil Company and, as all other conditions so far as we knew remained unchanged, we complained to the Standard Oil Company which sent its expert at the Whiting refinery (Dr. Gray) who made a careful examination of our works and methods, but was unable to diagnose the case. We were at that time rigging one of those little vaporizers such as had been referred to by a previous speaker, and upon Dr. Gray's recommendation we used 74° naphtha in it. As I have said, our stoppages were all in the consumers' services. We had no trouble at the works, so we connected the vaporizer, or the naphthalene preventer as we called it, with the outlet of the governor. While I did not positively know what it did or did not accomplish, yet after we put it in we had no further trouble. Such troubles are intermittent, and this may have been a coincidence, but it is a fact that none of the naphthalene which was supposedly carried forward in the gas ever reappeared in the drips or elsewhere. If there was, during the time we were operating the preventer, any napthalene present in the gas after it passed the governor it was burned. When running the preventer we used about two barrels of naphtha daily. It evaporated at a temperature of 185° F., under which temperature the two barrels would last about 24 hours. Whenever naphthalene crystals formed in the purifiers we immediately started up the preventer for a day or two and had no further trouble. One of the experiments which we tried was for the purpose of ascertaining whether this naphtha vapor did dissolve the naphthalene scale. We filled a large glass tube with large naphthalene crystals which we had taken from the dome of the purifier (the only place about the works where naphthalene crystals appeared) and passed the gas, previously cooled by carrying the pipe outside the building, through it. The glass tube was inside the building where the temperature was about 70°, and the gas passed at the rate of about 10 feet per hour. When the preventer was not in operation, the crystals were not affected in the slightest degree, but when the preventer was in operation the naphthalene crystals slowly dissolved. We have had no trouble since last fall, when the preventer was put in, though at that time the trouble threatened to become very serious. In our case the naphthalene did not seem to have formed in the services, but to have been carried forward to the services in a finely divided condition. Sometimes, though rarely, it reached the meter connections.

Mr. Wheeler—In replying to Mr. Slater's question about naphthalene being carried forward to the burner, I will say that it undoubtedly is. About three days after we started our new works at Binghamton, N. Y., last fall, all our Welsbach lights stopped, and about two days later all our Bray burners stopped. We had no other indication of naphthalene anywhere. We lowered our heats in the superheater and had no further trouble. That showed conclusively that naphthalene can be carried forward in suspension, due to the fact that something is slightly out of gear at the works, and it will go all through the city and be thrown down directly at the burners.

Mr. Witherby—In the method we used gasoline last winter I believe the naphthalene was held in suspension and was actually consumed at the burners. Our greatest trouble had always been at the works on account of small pipes and having to force the output. In using gasoline or naphtha I believe the naphthalene is held in suspension. We did not find naphthalene in the drips about the works and only very little in the mains. Some trace of naphtha was found in the drips of the main system, but in the works practically none. Especially not in such case as you will find it where you had used naphtha, dropped in at a point to remove naphthalene deposits, where you will only get a thick, milky solution at your drips. We found nothing of that kind in our works. We have had no trouble except in extremely cold weather. I believe the naphthalene was held in suspension and actually consumed at the burners.

Mr. Ferrier—Mr. Doty has mentioned the fact that the troubles from naphthalene occur principally in the changes at spring and fall. I have found that in the South almost the only time we had trouble with the naphthalene was in the spring; and even then it is almost confined to the works. I attribute that to the fact that where the gas is passed through the station meter at about 70°, the inlet of the holder seal is of lower temperature, and there is a sudden variation in temperature. During the course of the summer those temperatures are more nearly equalized, and then the naphthalene troubles entirely disappear. A good deal has been said about variations of temperature causing deposits of naphthalene, but I think another cause is in variations of pressure. Often you will see no naphthalene except in the purifiers. I attribute that to the fact that the gas is allowed to expand in the purifiers suddenly, thus crowding all the connections, and the compression and expansion which the gas undergoes will bring about an aggregation of molecules and will cause the deposit of naphthalene. Also in other parts of the system of distribution, wherever there is a sudden expansion of the gas you will be liable to have deposits of naphthalene.

Mr. T. D. Miller—At the meeting a year ago Mr. Gimper read a paper on the subject of naphthalene, and my recollection of it is that his theory was that the naphthalene went down with the moisture, and that but for that moisture the naphthalene would stay with the gas under ordinary conditions. My experience in the use of a plant where a steam jet exhauster is used showed that there was a copious deposit of naphthalene throughout the entire works, because the gas temperature was raised so very high that an immense amount of moisture was placed in the gas by the use of the exhauster. That was a confirmation of Mr. Gimper's theory to my mind. I find also that the rotary exhauster is a means of yielding an ample supply of liquid from the drips. That is the time when I am most apt to find naphthalene deposited, but sometimes the conditions are such that the drips, instead of yielding moisture, will produce nothing for days and days. At those times we have no naphthalene about the works. I understand that this Botley process is one in which the oil is injected into the gas by gasoline under pressure, and that the oil is atomized. Is that right?

Mr. Doty—The oil is atomized in pumping; the gas is not under pressure.

Mr. Miller—I had in mind an operation which was described in one of the journals a few months ago, where the gas was compressed to 50 or 80 pounds, and that was used to atomize the oil in the outlet pipe at the moment of going into the holder. The results obtained were stated to be very satisfactory, no naphthalene being deposited from that time on between there and the burner. But a very copious deposit of water was found in the drips. It occurred to me that this injection of oil into the gas under high pressure, and the sudden expansion that the gas will have when that pressure is reduced, will produce a slight but sudden reduction in the temperature of the gas, and at the same time introducing an oil which acts as a solvent to naphthalene, allowing moisture to go down with the naphthalene and remain in suspension in this vapor. After that, there being practically no moisture incoming, there is no further deposit of moisture from the gas, and, therefore, the naphthalene remains in the gas. My observation about the plant, and also about the town, induces me to believe that the theory is rather a tenable one. I would very much like to hear Mr. Doty speak of this process. I do not remember in what journal I saw it mentioned. Possibly some one here may recall it. It struck me as being a rather neat way of overcoming the difficulty. About our plant the gas never gets below 60° at any time. We never have enough naphthalene about the plant to create a stoppage. We often find a little frost on the top in the purifying boxes, and on the covers. Two or three times in the past two years I have had to boil out the inlet to the holder, but I do not want to believe we have any naphthalene until we get to the consumers' services; for there is where the sudden reduction in temperature occurs. In our section of the country not many of the houses are built with solid foundations, and as free access to the wind is left under the houses, when the wind strikes those services they plug up solid in a few hours. I think that during a cold

spell last winter we had more than 1,200 naphthalene complaints, but after we got down to regular cold weather we had no trouble. In the spring time, as soon as the weather begins to change and it becomes warmer, there are constant complaints to the Company, and we have the same trouble again. We have had no complaints now for about two months. As to Mr. Gimper's suggestion about the temperature of the gas getting below 50°, I would say it is not often that the tempera ture of gas anywhere throughout the entire system will get below 50°; it is only occasionally. I put the thermometer on top of my relief holder in order to get an idea how much correction to make on that relief holder to determine the amount of gas in the holder, and last summer on more than one occasion in the middle of the day it registered 160°!

Mr. Jenkins—I will ask Mr. Fullerton, of Buffalo, N. Y., to relate his experience regarding the use of hot water for the removal of naph thalene stoppages in service pipes.

Mr. Fullerton—Last winter at Buffalo we had a great deal of complaint, founded apparently upon the presence of naphthalene, and we tried gasoline and alcohol, and found that although for a little while there would be relief the same services would be stopped again in a day or so. I have been in works where a lot of gasoline was used, and naphtha of all descriptions tried; but neither would work in the right way. We found that steam and hot water were the only things that would do any good. We concluded to use it in the services, and we started with good, hot, boiling water, as hot as we could get it. We found that it would clear the services out; and it was on only one or two occasions where complaint was again made as to services which had been cleaned out in this manner. That was the only relief we got. In leading up to this I will say that there were at one time three districts in Buffalo (we have got them down to two now), and last winter one of the districts was not bothered with naphthalene in any shape whatever, whereas in the other district there was a lot of trouble. The yield, I believe, was about the same at both works. I attribute this to and agree with Mr. Doty that plenty of condensing room will do away with naphthalene outside of the works. I wish to ask Mr. Doty why it is that the putting in of gasoline at the outlet of governor will do away with naphthalene deposits? He says that it will not take up naphtha lene at 50°, but it certainly does away with the trouble. So long as it does that I do not care what it is, or where it comes from, or where it goes to. I would like to ask him why it is and what he thinks of it.

Mr. Doty—You will have to ask Mr. Botley.

Mr. Runner—Answering Mr. Slater's question as to whether naphtha lene is condensed and pumped out at the drips, I will say that we sent a great many barrels of naphtha into the mains, and it was carried through the services to the burners. When we put in benzine or naph tha we got no more naphthalene at the drips than we ordinarily do; it was undoubtedly carried to the burners.

Mr. Doty—Did you not find that with benzine you got more smoke at the burners?

Mr. Runner—Yes; and we would also get a benzine odor in the room from the gas.

Mr. Witherby—I would ask if it is universally the case that works in the north are more troubled in this way than works which are farther south? In other words, whether it is a matter of latitude?

Mr. Miller—I hope not.

Mr. Jenkins—I think not. I know of times at Columbus, Ga., when they did not make gas for three days because of the naphthalene troubles.

Mr. Witherby—I will state that of 63° naphtha I used but 3½ gallons per 100,000 feet of gas, and it seemed to be ample to do the work.

Mr. J. R. Lynn—The Memphis gas works were remodeled in 1891, and they had been troubled to a very great extent with naphthalene. In seeking to overcome the difficulty they had tried everything imagin able to prevent the deposit. They had dropped the outlet from the hydraulic main straight to the ground and run under the arch right up to the condensing apparatus. When the works were remodeled we found that we could run about 200 feet of 16-inch pipe from the hydraulic main in the open air up through the works, and after that was done we never found any trace whatever of naphthalene within the plant.

On motion of Mr. Butterworth a hearty vote of thanks was passed to Mr. Doty for his paper.

Introducing Mr. Hans Buhe.

Mr. Howard—We have present with us at this meeting a gentleman from Germany who is engaged there in the gas profession as an engineer of large works, and whose father, now deceased, was the engineer of a large syndicate affair controlling some 18 or 19 works. He is now in this country engaged in examining the different methods of water gas manufacture. I take the liberty of introducing to you Mr. Hans Buhe, of Dessau, Germany.

Mr. Steinwedell—Mr. Buhe was introduced to me and recommended to me and my son by the General Manager of the German works at which my son was employed for several years. He first came to this country at the Centennial, and since then has gone from one end of the country to the other, and has written some very fine things about the hospitality which has been shown him in this country. Mr. Buhe has now revisited us for the purpose of studying the subject of water gas manufacture—an institution which is largely peculiar to America so far, but which is now about to be introduced into the German system. It requires, of course, a great deal of practical knowledge on his part to examine the works as particularly as he will need to in order to introduce the system in Germany, and he will spend a considerable time in this country making the examination. He stands before you, and desires me to express to you his grateful thanks for your kind welcome. He can read and write the English language, but is not able to pronounce it very well, and so cannot express himself as he would like to in ackowledgement of your kind greeting. (Applause.) He is greatly interested in this country, and is wonderfully impressed by much that he sees here. He wishes me to express his thanks to the gentlemen of this Association for the many kind courtesies he has received from them; and he assures you that he will carry back to Germany a very grateful appreciation and recollection of your kindness to him while in this country. He bids me say that if he shall have the pleasure of meeting any of you in Germany, as he hopes to, it will be his endeavor to extend to you the same kindness which you have shown to him here. He thanks you for your kindness. (Applause.)

The President—We are all very glad to meet Mr. Buhe, and he is very welcome to take part with us in our proceedings.

The Association took a recess until 2 o'clock P.M.

First Day, Afternoon Session.

The Association reconvened at 2 P.M., and the President introduced Mr. B. E. Chollar, of St. Louis, Mo., who read a paper on

A FOUNDATION THAT FAILED AND THE LESSON IT TAUGHT.

The literature of engineering, on the stability of natural earth for the support of foundations, is neither extensive nor explicit. Beyond the statement that such-and-such kinds of earth ought reasonably be able to sustain such-and-such stresses per foot, under such-and-such conditions of moisture, etc., and an admonition to the engineer to make very careful examination of a sub-foundation before making a guess at what pressure it should safely carry, not much more is to be found in the books.

The existence of any important relationship between foundation area and linear dimensions seems to have received little thought; in other words, a foot is a foot and a ton is a ton, and a foot should support more or less tons according to the nature of the earth, but independent of the size or shape of the structure to be erected.

If we take a bar of iron, 1 inch square and 4 feet long, and stand it upright on the ground the pressure at the surface will be at the rate of 1 ton per square foot. There will be an angle of repose, or rupturing angle, below. If we take this angle at 26½°, and neglect friction, the diameter of the compressed section will increase by 1 unit for each unit of depth, and the stress at 1 inch down will be one quarter of that at the surface, or only 500 pounds per foot, while at the depth of 1 foot the stress will be at the rate of only 14 pounds per foot.

If we start out with 1 ton upon a square foot of surface, the stress at 1 inch in depth will be at the rate of 1,800 pounds per foot, or at 1 foot, 500 pounds, while we will have to go down 12 feet, instead of 12 inches, to reduce the stress to 14 pounds per foot, as in the preceding case.

If, now, we load a large area, say 100 feet square, with a weight of 1 ton per square foot, under the same conditions of friction and angle of repose, we shall have quite a different condition of affairs.

In this case the total load at the surface will be 10,000 tons, but at 1 foot below it will be 9,800, or within 2 per cent. of the load at the surface. At the depth of 4 feet the pressure supporting the area will be increased only by 1,000 square feet, and the rate of stress reduced only 10 per cent., or to 1,800 pounds per foot.

A failure on my part to comprehend the enormous differences in the rates of decrease of underground stresses, under various conditions of shape independent of weight, was the cause of unequal settlement and considerable damage to a gasholder tank at St. Louis, in 1896.

The foundation was 128 feet in diameter, and the tank to be supported 31 feet deep, making a total surface pressure of a little more than 1 ton per foot. As the ground had been previously tested at a pressure of 4 tons per foot, and had maintained that pressure for a period of two months without showing signs of weakness, it was concluded, therefore, that if it would stand 4 tons per foot 1 ton would be an easy load; but such, however, did not prove to be true, for before the tank was three-quarters filled with water one side of the foundation had settled 6 inches, and continued to settle until it reached its limit, about 8½ inches. By this time the top of the column at the point of greatest settlement was nearly 2 feet out of plumb. Fortunately the distortion of the tank and guide frame resulted in no permanent injury, for it had been specified that the angle iron at the bottom of the tank should project outward instead of inward, and that the bases of the columns should rest directly on the angle iron. The lower ends of the columns, being thus securely fastened, could not move outwardly, and, resting on the bottom of the tank itself, would settle equally with it. Hence there could be no shearing strain on the rivets fastening the columns to the tank.

After the tank had finished settling the water was taken out, the tank was raised by means of jacks, and the space between the foundation and the bottom of the tank filled up with sand. A row of sheet piling was then driven entirely around the foundation, and as near to it as possible. Some slight adjustments to the guide frame were made, after which the holder was put into service, and it has continued in action until the present time. The foundation is now only about 1 inch out of level.

A remarkable similarity will be seen to exist between the stresses under this foundation and those effected by other forms of radiant energy such as light and heat.

If we could have stood our gasholder on a point the stress below would have decreased in proportion to the square of the distance down, but as it rested, not on a point, but upon 15,000 square feet of area, hence, at 10 feet below upon 17,000 feet, at 20 feet the supporting area was less than 20,000 feet, so we see that it makes a great difference whether we calculate our energy as coming from what may be called a point or from a surface.

Light emitted from a point may be considered to decrease in proportion to the square of the distance; but diffused light, or that from a surface, never. A simple experiment will prove this. One has only to look at a lighted surface through a narrow tube, say 1 inch in diameter and 2 feet long. The small area seen through the tube will appear much brighter than the rest. The reason is that the eye that will not look through the tube gets only one ray from each point of the surface, or an extremely small proportion of the light emitted from the whole, the other rays being sent in other directions, while the eye that looks through the tube gets a large proportion of rays nearly parallel, which do not decrease rapidly with the distance.

The lesson is that big foundations push down harder than small ones, and that lights which have appreciable size decrease at all conceivable rates, except in proportion to the square of the distance.

Discussion.

The President—This paper is upon an engineering subject in which we are all interested. Has any member any different opinions to express, or has any one had a different experience to that of Mr. Chollar?

Mr. Chollar—I would add, as to this particular holder, that after we drove the sheet piling as close to the foundation as the railing at the top would permit, and after we had filled the tank with water, the outward pressure below was so great that you could put your finger between the top of the piles and the earth next to the foundation. This showed there was a great deal of strain even after the sheet piling was put down. It caused no injury, however. The point that those building gasholders had better look out for is the liability to get a foundation which is softer on one side than on the other.

Mr. Miller—Did you notice any tendency of the ground to bulge up outside of the foundation? Or did it all seem to be one way?

Mr. Chollar—There was just the downward thrust.

Mr. Miller—Was that down at the river front, at Station A?

Mr. Chollar—Yes.

Mr. Carpenter—As to one point Mr. Chollar made—speaking of the angle iron being turned out.

Mr. Chollar—I mean the angle iron at the bottom.

Mr. Carpenter—The column supports came down and rested on that angle iron?

Mr. Chollar—Yes.

Mr. Carpenter—From your paper I got the impression that your idea was that this fact saved the tank and helped to relieve the strain. I cannot quite see how this could be.

Mr. Chollar—The bottom extended out and the angle iron also extends outward instead of inward, as is the usual practice. Then the columns come down and rest on the angle irons. Now if the bottom of the tank should settle the columns would go right down with it, and it would be impossible to have any shearing strain where the columns were attached to the tank, for all would go together.

Mr. Carpenter—The greatest strain would naturally come on the diameter perpendicular to the radius of settlement.

Mr. Chollar—What I refer to is only where the columns were joined to the tank there could not be any shearing strain. We had already estimated upon a plan which provided for fastening the columns directly to the tank and without resting on the bottom.

Mr. Carpenter—It would be a simple matter to put in the necessary rivets to carry the shear.

Mr. Chollar—In the one case the whole column would rest on the rivets to sustain the weight; in the other case on the bottom.

Mr. Carpenter—But the whole weight of the column would be comparatively small.

Mr. Chollar—In the one case you would have that weight in shear on the rivets, and in the other case you would not. The tank would have gone over if the columns had not rested on the shell instead of the bottom.

Mr. Carpenter—I do not see how that affected it at the point of greatest strain due to the unequal settling. I understand that it settled on one side more than on the other?

Mr. Chollar—Yes; about 30° of the circumference.

Mr. Carpenter—Naturally that would tend to start the tank out of round and the pressure of the water would tend to balance this strain.

Mr. Chollar—The pressure of the water after the start would tend to throw it further into the ground.

Mr. Carpenter—If the tank were oblong the tendency of the water pressure would be to make it round.

Mr. Chollar—Not while settling on one side. Then the pressure would tend to make it go further into the ground.

Mr. Carpenter—If you take a sphere how would it be?

Mr. Chollar—If you take a soft felt hat, fill it with water and then tilt it to one side you will see whether it will come back round. The New York gasholder did not get round. The strain came on the diametrical section opposite the settlement.

Mr. Carpenter—The strain would come on the diametrical section opposite the settlement; whichever the case, the strain would go to the same point, and would throw the maximum load on that section, which would be enormously greater than the other strain.

Mr. Chollar—I mention that because the strain there was maintained by the diagonal braces throughout the frame.

Mr. Carpenter—It seems to me the strain caused by that unequal settlement would come on the diametrical section at right angles to that settlement, and would be far greater and more dangerous than any local shearing strain at points of attachment of the column supports.

Mr. Chollar—I do not doubt that; but if the columns had been riveted to the tank and supported by the shell, and had not rested on the bottom, they would have certainly been sheared on the rivets; but in this case it was not so, for the columns rested on the bottom. If the tank had a tendency to tilt over, and the columns were fastened to the tank, the resting point of the columns would be in motion, and the whole thing in an unstable equilibrium.

Mr. Carpenter—But so long as the column supports terminate near the bottom of the tank shell I do not think it would make much difference.

Mr. Chollar—But it is not good practice. The best way is to put it on the bottom and not on a separate foundation.

On motion of Mr. Wheeler a vote of thanks was passed to Mr. Chollar for his interesting paper.

The President introduced Mr. E. E. Eysenbach, of Columbus, O., who read the following paper on

CYANIDES IN THE GAS AND WASTE PRODUCTS AT COLUMBUS, O.

It seems to be quite customary to begin papers prepared for Association meetings with an excuse. Precaution, I think, against anticipated criticism. Nor can I resist from giving mine. The limited number of results given in this paper is due rather to the fact that our Secretary applied for it at the eleventh hour, than to a feeling that I had done justice to the subject.

The results I do give were made very carefully, and although different from what was expected present conditions as found at our works.

Articles appearing from time to time regarding the great value of the cyanides in our gas first aroused my interest in the subject. Besides, the continually increasing use of the cyanide process for the extraction of gold will always give a good market for these products. The value of Germany's exports along this line also make it appear as if we ought to make some money out of them. However, very little has been done in this country toward their recovery, or in increasing our knowledge on their occurrence, and, as far as I know, no commercially successful plant is now in operation.

The following determinations were made to help towards ascertaining the cause of this condition of things. Qualitative tests, made at various times and at various points in the scrubbing and condensing apparatus, never indicated the presence of either ferro or sulpho cyanides in the gas, but the cyanides were always present, as shown by their characteristic test.

Quantitative determinations were then made of these with results as shown below. The average yield of gas per ton of coal was about 9,800 feet, and duration of charges at our works is four hours.

First—Gas tested at inlet to washer scrubber—

Test No. 1..... 307 HCN, in grains per 1,000 feet.
Test No. 2..... 332 " " "

Second—Gas tested at inlet to purifiers—

Test No. 1..... 319 HCN, in grains per 1,000 feet.
Test No. 2..... 298 " " "

This is equal to about 3,000 grains of cyanogen per ton of coal carbonized. The low yield is probably due to four hour charges, as the largest amount of cyanogen is given off during the end of the charge.

Determinations were then made for ferro-cyanides on samples of two different oxides. The amount of sulphur in them gives a fair idea as to the amount of work the material has done. It was made up at the works from oxidized cast iron borings and sawdust. It has been in use about one year, and is still doing good work.

	Percentage of Sulphur in Dried Sample.	Percentage of Sulpho-Cyanides. NH_4CNS.	Percentage of ferro Cyanides calculated as Prussian Blue.
Sample No. 1.....	33.4	.38 per cent.	3.7 per cent.
" " 2.....	29.7	.29 "	3.1 "

Even if this material is kept in use until it contains 50 per cent. of sulphur, the percentage of Prussian blue can scarcely be expected to reach a point where it would pay to work it.

Two tests were then made to determine the amount of cyanogen left in the gas after leaving the oxide purifiers.

Test No. 1..... 47 HCN, in grains per 1,000 feet.
" 2..... 39 " " " "

Although these tests are rather limited in number, in a general way I would draw these conclusions:

First.—Practically all the cyanogen compounds reach the purifiers.

Second.—In order to recover the cyanides we must either treat the scrubbed gas or the spent purifying material.

Third.—A higher percentage is necessary before the cyanides could be extracted economically.

We have paid no attention to the subject whatever until recently, and may have thrown away material of much better quality in this respect

I would like to have presented something of more practical value to this Association; that is, I wanted to get more encouraging results to hold up as an incentive for others to experiment along this line. I feel, however, that others may be getting better results, and that hints from them will help us.

Discussion.

The President—Mr. Eysenbach certainly has given a good deal of careful study and work to this paper. It assuredly will be of interest to hear it discussed.

Mr. Gimper—Did Mr. Eysenbach test the hydraulic main liquor for cyanide?

Mr. Eysenbach—I did not.

Mr. Gimper—It has always been my understanding that the hydraulic main liquor is prolific in cyanides.

Mr. R. M. Atwater—Perhaps that which I have to say may not be of any interest, as the process for the recovery of cyanides in the field in which I am interested is not precisely the same as yours, since it is the retort coke oven, and not the gas retort. We, however, have in our work made some determinations along similar lines to those followed by Mr. Eysenbach, and, while not expressing it in just the terms that he uses, I may say we are able to recover from 1½ to 1¾ pounds of an alkaline cyanide, expressed in terms of ferrocyanide, from a ton of coal, which it is calculated will give profitable results. Of course, in our process we have the advantage of continuously through the year handling comparatively large amounts of coal. The conclusion is clear on our part that in carbonizing 100 or even 200 tons of coal per day it is not profitable to recover the cyanides, but in handling 500 or 1,000 tons of coal per day there is profit in such working. Replying to the question of Mr. Gimper I would not be surprised to find the amount of cyanides in the liquor from the hydraulic main greatly in excess, even to three or four times the quantity found in the ordinary washer.

The President—I think Mr. Warmington has had experience in recovering cyanides.

Mr. Warmington—Experience, but little else. We have tried to get Prussian blue, and although we expended considerable money in our experiments, the latter were by no means successful. The cyanide compounds will be found in greatest quantities in the hydraulic mains and in the ammoniacal liquor.

Mr. Doherty—I do not want to interrupt the discussion, but, for fear it may close before another opportunity presents itself, I move that the Association appoint a committee to consider this subject, the committee to report at our next meeting. I think the paper of Mr. Eysenbach is a very creditable one, but I wish he had gone into the subject more fully. It is something I wanted to study, but have not had time to take it up. Indeed, I do not know anything about it practically.

The President—The Chair will entertain that motion immediately after the discussion.

Mr. Ferrier—Can Mr. Eysenbach inform us what proportion of cyanides is found in European gas works?

Mr. Eysenbach—I would say from 8 to 15 per cent.

Mr. Ferrier—How do you account for the difference?

Mr. Eysenbach—I cannot account for it.

Mr. Gimper—Variations in the quality of coal might account for the difference.

The President—Will Mr. Lynn give us some information on this subject?

Mr. J. R. Lynn—I have never made any special investigation, but it occurs to me that the heats carried on the benches will to a great degree determine the quantity of cyanides recoverable; the higher the heats maintained the greater will be the quantity that may be recovered.

Mr. Eysenbach—I would like to add that the amount of work done by me, and from which I drew my conclusions, was limited. I did not have time to get a large number of results, but the results which I did obtain, and have given, were from carefully made tests, and I think they are correct.

Mr. Hayward—I would suggest that, in following up this subject, Mr. Eysenbach secures all the samples of oxide he can obtain. I have had samples sent me from time to time, one of which I particularly recall. It was a specimen from a New England works, in Massachusetts. The consignor in writing about it said he had turned his gas works into a Prussian blue factory and would like to know how he did it. I find that the samples from different works vary considerably; in fact, that no two agree. Some years ago I was interested in this subject. Knowing the high price of cyanides, the large importations made to this country from the other side, and the large quantity made over there in the gas works, I thought possibly something could be done in that direction in this country. I suggested to a chemist who was going to the other side that if he would look into the matter in England and Germany I would gladly pay his expenses. He eventually sent me a report, a summary of which was that we had better, at present, from the developments there, let it alone. That there was not enough in it to pay, and that the prices were continually decreasing. I believe one concern in Brooklyn who took old oxide for the purpose of recovering the sulphur and cyanides, was obliged to give it up, not because enough of these products were not recovered, but because there was not sufficient profit in it, and for the further reason that the conditions in this country are entirely different from what they are, say in England. The question of freight enters largely. The freight is so large on getting the material back to a place where it can be treated that the operation does not pay. In order to make it profitable, as Mr. Atwater has said, a very large quantity of coal must be carbonized.

Mr. Atwater—Let me refer to one point made by the last speaker. The McKinley tariff, as a rule, increased the rates of duty, but, as a concession to the silver men, the tariff on cyanide of potassium was cut in two; consequently it was more profitable from that time on to import the foreign article than to make it on this side, which largely accounts for the fact that now American works do not find it profitable to produce the material.

The President—Is there anything further to be said on this subject?

On motion of Mr. Gimper, a vote of thanks was given to Mr. Eysenbach for his paper.

Mr. Doherty—I now move that a committee be appointed by the Chair to investigate this subject and report at the next meeting.

The motion was seconded by Mr. Wheeler and adopted.

The President—With the assent of the Association I will not announce that committee until to-morrow morning, as I would like to give the matter consideration by conferring with the members most interested in the subject.

OPENING THE QUESTION BOX.

At the suggestion of a member the Question Box was opened. The Secretary read the questions in this order, the replies being as recorded:

No. 1. "Does anyone know of the use in this country of chameroni pipe which has been so extensively used in France?"

Mr. Doherty—I have never heard of it. What is chameroni pipe?

The President—I do not know. Can anyone answer the question? If not we will pass it over for the present. Perhaps the member who asked the question may give us some information.

No. 2. "What is the best method of supporting and protecting main pipe on bridges?

Mr. Gimper—I do not know what may be the best method, but I tried one which proved very satisfactory. I had a pipe, made of the best boiler iron, 8 inches in diameter, leading across a bridge. To protect it I took the packing that we use for joints and packed it very closely. Over that I put tarred paper and tarred felt, over which I put bagging, sewed it up, and then painted it over thoroughly. It made the best covering that I have had in my experience.

The President—Will Mr. Chollar tell us what is the best method?

Mr. Chollar—I cannot say what is the best although I have tried several. Sometimes I have carried it right over the roadway in a box, which is a very accessible way. Expansion joints—especially if it is an iron bridge—make it all the more satisfactory. Another way is t hang the pipe in a sling under the roadway. In the case of a canal bridge—I had one case where I took advantage of the time when they drew all the water off that level, to go down under the canal with the pipe and come up on the other side. I would say that the best way to do it is—the best way under the conditions existing.

Mr. Odiorne—I think Mr. Morgans can give us some information from his experience, as he has to cross a river five times on five bridges.

Mr. Morgans—All I can say is that about four years ago I bought some 6-inch fiber pipe for one of our bridges on the main street with which I had had a great deal of trouble in previous winters. The pipe was placed on the planking and unprotected. On all the other bridges the pipes are either packed in abestos or in a box with straw, but this particular pipe was 56 feet long and we gave it special care, on account of its being on the main street. Since placing the fiber pipe there I have had no trouble whatever with frost, and upon recent examination I found it in just as good condition as when first laid, while every other pipe in our city has had frost in it. After a little further experience I intend to replace them all with fiber pipe.

Mr. J. T. Lynn—We have never put any protection on pipe laid across bridges, except to have the pipe laid on the roadway of the bridge, with blocks under it from 6 to 8 inches high, so that we can get at it at all times and keep it painted. That preserves the pipe as well, if not better, than putting a covering on it. Any covering which you may put on will gather more or less moisture, and will cause the pipe to rust. We have had no trouble from the freezing of pipes. We used wrought iron pipe over all the bridges. This was a large pipe with expansion joints. The bridges average about 200 feet in length.

The President—Have you ever tried paper fiber covering for pipes?

Mr. J. T. Lynn—I only tried covering once. The result of the experiment was that both the covering and the pipe had rotted. The moisture had gotten in there and simply rusted the pipe through.

Mr. J. R. Lynn—Any kind of covering that would take up moisture would only hasten the gathering of frost inside of the pipe in cold weather.

Mr. G. T. Murdock—I have one piece of 4-inch pipe which has been exposed on a bridge for six years, and have never had any trouble from frost with it.

The President—What are your approaches to and from the bridge?

Mr. G. T. Murdock—We use 4½-inch wrought iron pipe, with expansion joints.

Mr. Whipple—I have one 8-inch pipe, 900 feet long, and find that if we keep the elbow free there is no trouble. In another 6-inch pipe, 1,500 feet long, we never have frost except in the bend. I think the secret is in keeping the pipe straight, and increasing it slightly as it comes from the ground in the direction in which the gas is flowing. We have an 1½-inch pipe that never freezes except at the elbow just as it comes out of the ground.

Mr. Odiorne—Is it not the fact that the amount of gas passing through these pipes largely determines the amount of frost accumulating? If the pipe does not pass much gas it will not accumulate much frost.

Mr. Whipple—One half of my gas goes through the 8 inch pipe.

Mr. J. T. Lynn—In passing the pipe up over bridges I have always made it a practice not to use any cast mains at all. I use wrought iron pipe, making the bend very gradual. If you can arrange it so as to leave that part of the pipe covered with loose dirt, the tendency to freeze is much less than if you pack it with any hard substance.

Mr. C. H. Dunbar—I think the whole secret of success lies in doing away with the fittings and the angles. I have one 6-inch pipe, 3,000 feet long, and never had any trouble after eliminating the fittings and the angles.

Mr. Geo. McMillan—It seems to me that the ratio capacity has very much to do with the effect of frost on pipe. I remember a 4-inch pipe running across a bridge 375 feet long that bothered us by its freezing continually. We finally put in an 8 inch pipe, without changing the fittings at all, except to increase the size, and since that change was made, and during the years I have been familiar with it, we have not been bothered with frost.

No. 3. "What experience has been had as to the desirability and efficiency of underground district governors?"

The Secretary—The answer to this question was assigned to Mr. John Young, of Allegheny, Pa. He is unable to be present, but writes as follows:

"My experience with underground governors has been confined to natural gas. They were put in by an opposition company, which we ultimately bought out. They had a great deal of trouble with them. They were continually getting out of order. Two men were suffocated while repairing one of them, and the large cavity in the street was a constant source of danger from explosion in case of leakage. I had them all taken out and put above ground. In the case of illuminating gas, and under proper conditions, they may be all right, but personally I would prefer to have the governors above ground where they can be easily got at, and where the risk of doing damage if anything goes wrong is reduced to a minimum."

Mr. J. T. Lynn—Rather than put the governors underground we prefer to put them with the meters. The man who attends to the governors attends to the meters. We had a great many wet meters in Allegheny, and had to have a great many men going over the district every month keeping the water line correct on the meters. The same man attends to the street governors. We never put any underground, preferring to keep them where we could get at them in case they needed repair.

No. 4. "What is the best method of decarbonizing retorts?"

Mr. Odiorne—My experience in decarbonizing retorts has been somewhat varied. I have used various appliances, among which were the steam blower and the old-fashioned method of chiseling. The former method is the best in my opinion. Retorts should be decarbonized frequently, and should not be allowed to run from over four to six weeks. The steam blower performs its work readily and without injury to the retorts.

No. 5. "What should be the minimum monthly bill rendered a consumer by a gas company?"

Mr. J. T. Lynn—The best answer to that would be the statement of the consumer's meter.

The President—We would like to hear Mr. Cowdery's statement of his custom or plan in the matter under consideration.

Mr. Cowdery—We have no custom in that respect. We accept the bills as they come to us. A woman, with tears in her eyes, made to me a good deal of complaint over the size of her gas bill. She said she did not know how she was ever going to pay it. Wondering how I was going to help her out, I looked at the bill and saw that it was for 20 cents! I am sure I would not know where to set the minimum.

Mr. Walker—I presume that question was asked by a manager who has had experience similar to mine. A number of our customers have combination fixtures, and practically use the electric light, retaining the gas for emergencies. In all such cases we make it a rule to charge

the customer for 100 feet. Of course it is some annoyance to the gas company, but we like to have them retain the meter for emergencies.

Mr. Jenkins—I think the answer depends much upon the average cost of installation. I think a fixed service charge for a meter is practically an insult. I think perhaps an average cost for meter and service would be about $20. Six per cent. interest on that would be $1.20; 5 per cent. depreciation, $1; repairs on meter, 80 cents, or an aggregate of $3. I do not think the charge ought to be less than $3 per year, which is without regard to the quantity of gas used. In some companies, if the amount of gas used by a consumer is less than 100 feet in any one month, they do not render a bill for that amount, but let it accumulate, finally making out a bill covering several months for the gas consumed during those months—for the months between they charge so much per month for use of services and meter—and I think you can figure that pretty closely at $3 per year.

Mr. T. D. Miller—As to accommodation meters, it is our rule to charge 25 cents per month for each showing no consumption; anything over a 5-light meter is 5 cents per light; a 10 light meter is 50 cents, and a 100-light meter is $5 per month. When the consumption is not equal to that rental we collect both the rental and the gas bill.

Mr. Whipple—I was the author of that question, but I asked it in a little different form. What I asked was as to the advisability of sending a minimum bill. I have talked with quite a number of gas engineers about it, some of whom thought it advisable to render a minimum bill, while others did not. I render a minimum bill up to 300 feet.

Mr. Chollar—Mr. Cowdery shut off my answer. It struck me that an easy answer to the question was that the minimum monthly bill rendered would be the quantity the meter registered.

Mr. Geo. McMillan—Perhaps it is a trifle hard to know always what is best, but our practice has been to charge 25 cents per month as the minimum. If the customer burned only 100 feet it would be worth 15 cents; but we send a bill for 25 cents and never present a bill for less than 25 cents. If the consumer burns 300 feet the bill sent is for 30 cents. We make no charge for the meter except in the event that it does not register the use of 25 cents' worth of gas. Many objected to that at first, but became reconciled to it when we explained our reason for it by saying that otherwise, although we had set the meter, we would get nothing out of it. Now they do not object to it, and the plan works very well.

Mr. J. H. Farrell—Our practice at Wausau, Wis., has been to send a minimum bill of 20 cents, and we find that it works very well.

The President introduced Mr. F. B. Wheeler, of Binghamton, N. Y., who told of

PROBLEMS IN NEW BUSINESS: SOME HISTORY AND EXPERIMENT.

The experience of all progressive gas managers is that the most liberal policy of free services, free connections, free distribution of good burners to consumers is the one that pays the best. When to this is added house piping done by the gas company, upon various plans of introduction, from cost charges to absolute free gift, and tasteful gas fixtures at a minimum margin for handling and installing, the old-time bars between the company and the wage-earning public are swept away for ever, and, with a reasonable price for gas, our commodity, the demand for which is ever on the increase, the way is paved with golden stairs for its easy introduction into all homes.

The greatest lever a gas company can lay hold of in the upbuilding of bulwarks against the socialistic and municipal ownership ideas is the one of local "popularity." This powerful lever—"popularity"—is the one we should seek, grasp and sedulously cultivate. What can popularize the gas company more than to introduce gas into the homes of the "masses" of tenants and wage earners who are voters? These constitute the bulk of the population. Should not this great majority be reached, catered to, its wants studied, a percentage of its hard-won wage saved for us, and used for the comfort and enlightenment of its homes thereby?

The enormous gains in sales shown by English gas corporations have been won by reaching for the homes and the pockets of the wage earning masses with inducement and prices available to all.

This was recognized by a few apostles of cheap gas some time ago, but it is only just now that the body of gas managers are recognizing it here. The majority can and will save nickles, dimes and quarters to make up a dollar a month for the great comforts and conveniences gas will bring to their homes, usually rented and scanty of everything but the strictly bare necessities of life. Do we all realize how profitable the consumer is who pays us $1 a month for gas regularly, and who is pleased and contented?

It is a very nice thing to sell $100 worth a month through one gas meter. It saves lots of clerical work in the office, and saves capital account in the purchase of meters, etc.; but it seems to me to be much more pleasant to sell $100 worth through 100 meters, thereby reaching the families of 100 voters, who, pleased and contented with their local company, will march up and vote down the issue of more city bonds for a proposed city plant that will add its burden to the already heavy one of local taxation. Am I right in these views? At any rate I am trying to manage my company along these lines, as this paper will later develop. Our city is, and has been for some years, a hotbed of labor agitations, and I assure you it is pleasant in our ears to have a hard working woman come in and lay down a dollar's worth of hardly saved nickles on the counter, and, as we are receipting her month's gas bill, have her say: "That stove you set for me is such a comfort;" or, "I feel so safe now with my children, to have gotten rid of that kerosene lamp on the table." Oil sells here for 4 cents a gallon at that.

One of the first lessons I learned in getting new business was this: Make the people see they are getting a mighty good thing, and they will run like sheep. When they get their houses and stores piped for nothing, where before they paid the plumbers $35 or $40, they see they have caught a good thing.

Here comes the second lesson. If the local plumbers' association, which rules sometimes with a rod of iron, won't meet you on fair terms of co-operation in getting new business for themselves as well as you, do everything yourself. Buy your own materials at wholesale rates, and scoop the whole thing. The scum of the city will rise up and call you blessed. This has been my experience everywhere. This plan will give such big returns on the cost of the investment as to surprise those who have not tried it.

How are we to reach the great army of tenants and small householders whose houses are unpiped, when tenants neither will nor can fit up their landlord's property, when landlords will not spend a cent for gas improvements for their tenants without raising the rent, and when the small householder cannot increase his capital account for lack of means? I answer: "Put gas pipes and fittings on these properties from street main to burner free of cost."

In a city of 45,000 population, suppose there are 2,000 unpiped houses already on the lines of the gas mains, suppose it costs the gas company $15 each to pipe them and furnish gas pipe fixtures, to supply meter and connections, $7, to supply service, $10, a gas range of best pattern with 16-inch ovens, $12, a total per house of $44. The whole outfit costs, then, a capital expenditure of $88,000. Suppose each of the 2,000 tenant families consumes $1 worth of gas per month, then the gas company has added $24,000 to its income. If, of each $1 worth of gas, 25 cents is profit, the net earnings' account will be the gainer by $6,000. As the ruling rate of bond interest is now 5 per cent., after the interest on this $88,000, amounting to $4,400, is paid, $1,600 will have been earned, applicable to depreciation and dividends on the stock. Then landlords and house owners will have had improvements put into their buildings at no expense to them, and the contentedness of the occupants increased in proportion. The owner class is thus captivated with this plan, and will be loath to trouble the gas company when extra public burdens are under discussion.

The hard-working tenants, users of our product, are placed in an attitude toward the company as a corporation very different indeed from that so eloquently phrased in all the public prints and from the mouths of party demagogues. *They will not forget you, because you have done something for them.*

The gas company's directors, who no doubt were against this plan at its inception, now will regard the balance sheet of the operations among these 2,000 families with a fond eye, and will wish they could pick up another 2,000 families somewhere.

The entire account of these transactions should be kept carefully separate on the general books of the company. They will look well there when some time in the future you may be required to render an account of your company to the "Powers of the Social Mass." Then you can show up that $88,000 you have given to the people.

Get a foreman who is an artist in his work, and who can talk well, as a canvasser. When one man on a newly canvassed street puts in gas and has his house piped by the gas company, the curiosity of the neighborhood is excited to a high pitch, and sooner or later the rest come into the fold, especially if their interest is prodded on all the time by a sharp-witted foreman working in the vicinity. The best workmanship, first class materials, thorough tests of tightness are all points to be looked after, to please the new consumers, and have everything satisfactory.

The experience gained in meeting the requirements of various locali-

ties has enabled me to plan out on a broad scale a campaign of education in the virgin soil of the Parlor City, where my fortunes now lie with the gas company there. This city had in its limits, census of 1890, 35,000 inhabitants. On January 1, this year, 7,500 school children were enrolled, indicating a population of 42,000, figured by the usual standard. On May 1, 1898, the mileage of main was 21.5. The number of consumers was 1,832, or 85.2 per mile. The average consumption per meter was 19,188 cubic feet. The mileage of streets was 85. The number of consumers using less than one dollar's worth of gas, July sales, was 845, or 44 per cent. These figures are given to show the temper of the mass. There were few stoves. Meters, meter connections, services and complaints were attended to by the local plumbers, as well as stove sales and stove setting. The charges were of the usual exorbitant kind. I decided to inaugurate a preliminary canvass of the streets most likely to want mains laid that summer, and a general census of unpiped or unconnected houses, etc. Three canvassers were sent into the field with instructions to fill out a blank for every family found, viz.:

(A)

Street.....
Name..... No. House.....
Service in house.....
Meter in house.....
Is the house piped?.....
Gas cooking appliances in house.....
Are they used?.....
How many burners in house?.....
How many rooms in house?.....
Is occupant owner or tenant?.....
Order taken for service.....
Order taken for meter.....
Order taken for stove.....kind.....
Remarks.....
.....
.....
Above visited by.....
On.....

These blank cards are perforated at the top and were strung together by streets or blocks in a flexible leather cover, convenient for pocket and handling. These cards, as returned to the office with data filled out, were assembled by districts, and the data tabulated. The results were certainly astonishing. In one district out of 1,888 houses, 1,065 were occupied by the owners, 823 by tenants, or 43.6 per cent., were of the tenant class; 1,202 were not piped for gas. These were all neat, comfortable houses, occupied by people having fair possibilities as future gas consumers. Of this number 101 tenants wanted gas right away, 140 wanted their houses piped, but would do nothing to improve their landlord's property, nor did they want their landlords importuned for fear of a rise in rent. We started in laying mains on streets indicated, and piped some houses. After consultation with our president, the following plan was adopted to try and corral some of these unlighted homes.

Services, connections, burners, etc., of course free. Houses would be piped with concealed piping down stairs and open piping up stairs *free of cost*, if we were paid $2.10 per room for 1,500 feet of gas at $1.40 per 1,000 in advance. That is to say, the prospective consumer simply advanced us some money on his gas bill. When he used up the amount he had paid in advance, he then commenced paying his gas bills regularly. Stores were piped, open piping, for $1.40 per opening, or 1,000 feet of gas, paid for in advance. These prices made a six room house cost 9,000 feet of gas or $12.60 paid for gas in advance. In the four months, July 15 to November 15, we piped 300 houses in this district, all of which are using gas, and at least half of them have ranges. These people all signed an agreement to use gas for *three years* "as much as they needed." A copy of the advertisement carried in the papers is here appended, (B); also a copy of the combination contract and application, (C).

Six hundred new consumers were added in six months by this liberal plan. When we commenced the usual local plumbers' association opposition was met with in a particularly arbitrary form. Needless to say, when cordial cooperation could not be had, the organization was promptly ignored. A ten-room house, their schedule, cost to pipe from $30 up. The owner or tenant only had to pay us $18 or $20, all of which he received back again in gas as he used it. The money received thus for gas in advance covered our cost for labor and materials.

(B)

GAS.

Free Services.—All service pipes for buildings for which applications are made before September 15th, 1898, will be run to the meter *free of cost* to the owner or occupant of property. This offer is made with a view of largely increasing the number of our consumers, during the summer months, and will not prevail after above date.

Free House Piping.—Anyone on the lines of our gas mains may have his house *piped for gas, free of cost*, who will sign a contract to burn gas for lighting purposes for the period of three years, and will pay in advance for gas a sum equal to the cost of piping. A six-room house will be piped *free*, if you pay in advance for 9,000 feet of gas to be used as you need it. You will not receive a bill for the gas you use until you have entirely used up this 9,000 feet paid for in advance.

An eight room house will be piped *free*, if 12,000 feet are paid for in advance. This offer holds good on applications made from now, before October 15th, 1898.

Free Ranges.—Anyone living along the line of our gas mains may obtain a gas cooking range or heater, *free*, who will agree to use the same for three years, and will pay in advance for gas a sum equal to the price of such a range or heater.

You can get an elegant Jewel $12 range *free* by paying for 8,500 feet of gas in advance.

This offer is good on applications made from now, before November 15th, 1898.

(C)

APPLICATION FOR GAS, HOUSE PIPING AND GAS STOVE.

No.... Owner of premises.....
To BINGHAMTON GAS WORKS:

The subscriber being the .....of the premises situated at..... requests the Binghamton Gas Works to put service and connections with meter on said premises to supply gas to me, subject to the rules and prices of the said Company. I also request said Company to pipe .....rooms in said house and herewith agree to use gas for three years in consideration of the payment of $.....for.....cubic feet of gas in advance at $1.40 per 1,000.

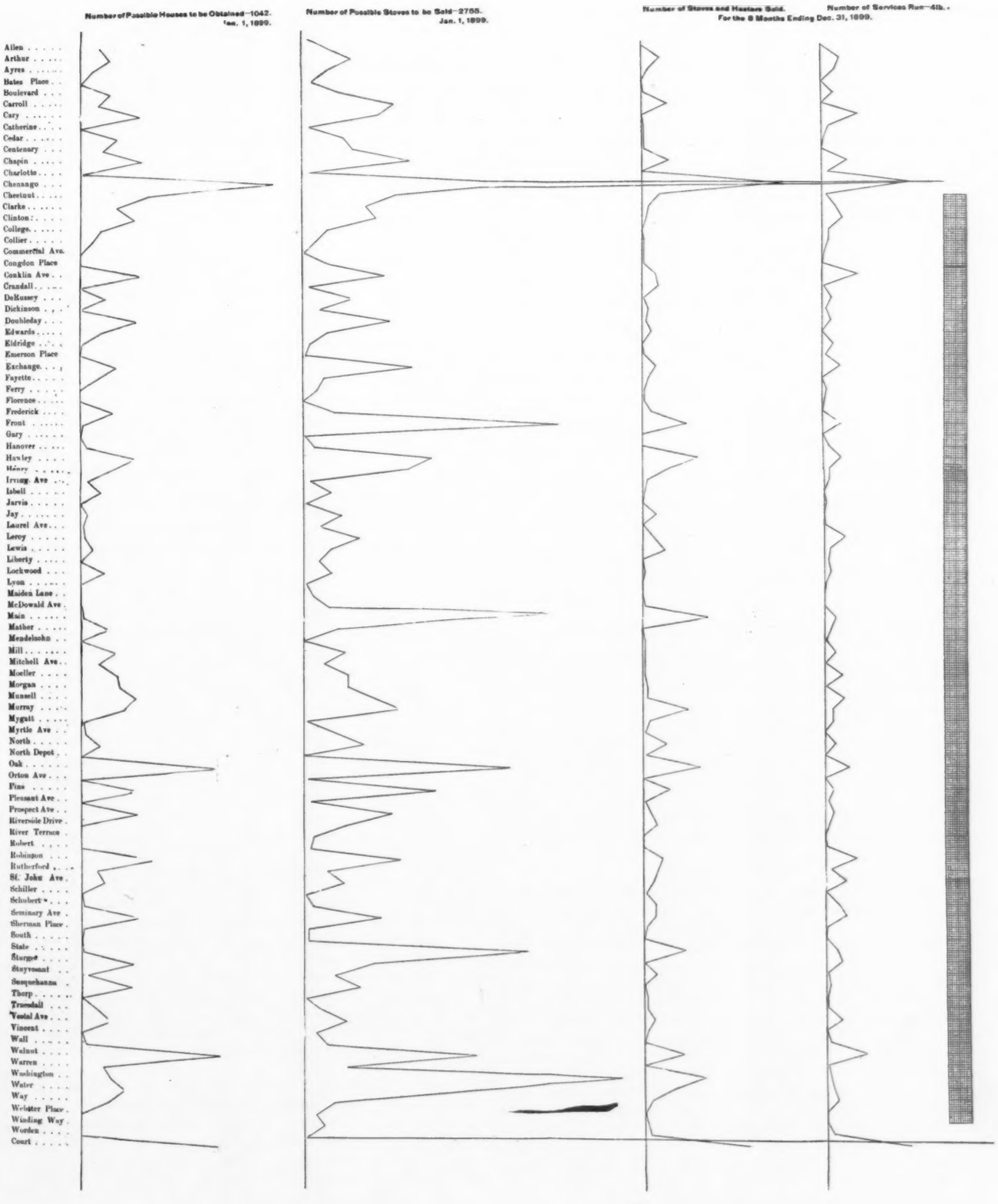
I also request said Company to supply me with a No.....gas stove in consideration of my agreeing to use same for three years and in consideration of the payment of $.....for.....cubic feet of gas in advance. The stove remains the property of the Company until the end of the contract.

Sign here.....
.....
Supt.

Date of application.....189....
Service run.....189....
Meter set.....189....
House piped .....189....
Stove set.....189....

We were thus enabled to pay for all the work as it went along without drawing on the regular funds of the company. How was this account handled on our books? In this way. Take a six room house for illustration. The tenant paid us $12.60 in advance. A general account was opened in the general ledger, entitled "House Fitting." This account was credited with $12.60 from the cash book. This tenant used 1,500 feet of gas the first month, amounting to $2 10. "House Fitting" on cash book and ledger was debited with $2.10, and the consumer's ledger was credited with $2.10 from the cash book to close this tenant's individual account. This transaction was not done separately for each case, but was done in one ledger and general cash book entry. Another general account was opened in the ledger entitled "House Extension." To this we charged all costs for labor and material in doing this tenant's work. This account is a cumulative one, remaining open until the close of the year, when it is carried as a construction account, to be reduced annually by a fixed per cent. charged off for depreciation.

To return to the canvassing scheme as an instrument in getting new business. After the rapid preliminary canvass described above, but one canvasser was employed, the pick of the three. He canvassed for all kinds of new business, including of course, all forms of stoves, using the perforated blanks obtained in the first canvass. These, you will


Number of Possible Houses to be Obtained—1042.
Jan. 1, 1899.
Number of Possible Stoves to be Sold—2755.
Jan. 1, 1899.
Number of Stoves and Heaters Sold.
For the 8 Months Ending Dec. 31, 1899.
Number of Services Run—415.
Allen
Arthur
Ayres
Bates Place
Boulevard
Carroll
Cary
Catherine
Cedar
Centenary
Chapin
Charlotte
Chenango
Chestnut
Clarke
Clinton
College
Collier
Commercial Ave.
Congdon Place
Conklin Ave
Crandall
DeRussey
Dickinson
Doubleday
Edwards
Eldridge
Emerson Place
Exchange
Fayette
Ferry
Florence
Frederick
Front
Gary
Hanover
Hawley
Henry
Irving Ave
Isbell
Jarvis
Jay
Laurel Ave
Leroy
Lewis
Liberty
Lockwood
Lyon
Maiden Lane
McDowald Ave
Main
Mather
Mendelsohn
Mill
Mitchell Ave
Moeller
Morgan
Munsell
Murray
Mygatt
Myrtle Ave
North
North Depot
Oak
Orton Ave
Pine
Pleasant Ave
Prospect Ave
Riverside Drive
River Terrace
Robert
Robinson
Rutherford
St. John Ave
Schiller
Schubert
Seminary Ave
Sherman Place
South
State
Sturges
Stuyvesant
Susquehanna
Thorp
Truesdall
Vestal Ave
Vincent
Wall
Walnut
Warren
Washington
Water
Way
Webster Place
Winding Way
Worden
Court

see, gave all necessary information for his use as to gasoline stoves, gas ranges, meters, services, etc. They were filled out in black lead pencil. At the close of the canvassing season, upon these blanks there was entered the season's work upon each card, meters set, services run, stoves set and the kind, houses piped. This was done in black ink. They were then ready for the 1899 spring canvasser, having upon them the original pencil canvass, and the ink gain in new business. Just consider what an engine this is when placed in the hands of an expert canvasser! From these perforated blanks thus prepared, a miniature copy is made in ink of each one, and placed in a regular card index cabinet, arranged alphabetically by streets. This stands by the manager's desk, a permanent record of changes in the condition of affairs in all parts of the city. A sample is here given.

(D)

Street.....No.....Name.....
Is house piped?.....How many rooms?.....
Is service run?.....
Is meter set?.....
Is cook stove set?.....Kind.....
Any heating appliances?.....Kind.....
Gasoline stove?.....Electric Light?.....
Owner or tenant?.....Class.....

The manager, standing before this cabinet, by running his fingers over the alphabetically arranged street cards, can tell at a glance the exact state of the gas business anywhere in the city. He can tell the worked out territory, where it is of no use to spend money for canvassing. He can pick out all the weak spots of the net of new business gains, being woven slowly from year to year before his eyes, and can intelligently direct his engines of warfare in all quarters. As the applications and contracts come in filled up, after inspection by the manager, the office makes out the necessary orders for the shop gangs, then the applications are returned to the manager, who has them copied upon a temporary set of card index. A sample card is here given:

(E)

.....No.....Street.....
....No.....Application.....
....Requests service.....meter.....
.....Stoves.....Kind.....Price.....
.....Piping.....No. rooms.....Price.....
....Date application.....189....taken by.....
....Service run.....189....office.....
....Meter set.....189....Canvasser.....
....Stoves set.....189.....
....House piped.....189.....
.....
.....
.....

When the service gang's report of service run, the meter setter's report of meters set, and the fitter's report of stoves set or houses piped all gradually come in, they are consecutively noted on this temporary index system. At the end of the second season the face of this index card is copied in full on the permanent card index of record, which we call "The Holy Inquisition," and also in blue ink on the canvasser's set of perforated cards, where during this second season he has made his entries in blue pencil. Thus black pencil, black ink, blue pencil, blue ink, represent the preliminary canvass, the first season's work, the second year's canvass and its season's work. The third year's campaign would then be carried on, its records being made in another color, red, say.

In the "Holy Inquisition" index, before whose cabinet the very office boy bows, at the end of each street a blue summary card is filed. A sample is here given (G).

(G)

Services	17
Meters	7
Piped	8
Gas Stoves	5
Gasoline	2
Owners	14
Tenants	12
To be secured	26

.....Cary Street.

This card summarizes the state of the gas situation at the end of any period stated, say Jan. 1, 1899, in that street, so many unpiped houses, so many families without stoves, so many chances for business along the line. Under the heading "Class" in the inquisition card, a commercial rating is set down. For instance, A denotes good house and family; B medium house and family; C denotes poor; D means of doubtful ability to pay anything; E means is on black list. These five ratings are, of course, liable to change from time to time with the same family. This plan in the residence section of a city can be kept up with ease; in the tenement block district it requires frequent changes.

The summaries of the blue cards are plotted on paper by streets and numbers of each set of data, as shown on the accompanying chart (H).

With this up-to-date instrument at his his hand, cannot the manager keep tabs on his town?

"Ads."

Shakespearean and poetical quotations, illustrations of the Jack-in-the-Box order, and devices of the patent medicine class, are of little use in advertising for a gas company's purposes. "Ads." should be local in character and should appeal to the practical. They should always emphasize the "Good Thing" idea. In daily papers, a very heavy plain black border framing the item is one of the most catchy devices to arrest the attention of the reader. I append two samples for illustration. One, appearing the day after the annual report of the fire chief, caused a sensation in our city.

(I)

Fire! Fire!

Chief Hogg's Annual Report shows that last year in this city there were—

18 Fires from Gasoline Stoves
13 Fires from Kerosene Lamps
17 Fires from Overheated Stoves
13 Fires from Defective Chimneys
or 53 Fires out of a total of 129,

all of which would not have happened if Gas had been used for light and fuel.

The money loss was $17,530.09, which would all have been saved if Gas had been used for light and fuel.

Place your orders quick with the Gas Company before you burn up.

(J)

GET YOUR HOUSE PIPED.

The Gas Company will do the house piping free of cost if you pay for some gas in advance. Hundreds of homes are now being fitted up for gas in this way

THE WORK DONE COSTS YOU NOTHING.

It only takes two days to pipe your house.
Call and see them.
Now is the time to take up the bedroom carpets.

The insurance people reduced the rate 15 cents a hundred to people who would put in gas, thereby throwing out the inflammable oil.

Many landlords refused rental to tenants who owned gasoline stoves unless they installed gas ranges. The other has brought us in over 50 houses as new consumers.

Heavy type "ads." carried on the front pages of theater programmes are always read, and by a large number.

The problem of distributing our product and getting new business is one of the greatest problems of the gas industry. The thoughts strung together in this paper represent some very hard facts of experience in active competition, both with electric light companies, and the greatest foe to modern progress, poverty. In different sections of the country and different cities of the same section, local methods of attack widely differ from each other and are well adapted to the local requirements; but I believe that if a large volume of business is to be acquired in a comparatively short time, to widely push the business, the elastic and liberal system outlined in this paper is emphatically the one to follow, and I am pushing this plan to its logical conclusion in our city.

Discussion.

The President—We have listened to a very interesting paper, and I sincerely trust we will have a full and free discussion of the matters which Mr. Wheeler has presented.

Mr. Doherty—Some portions of the paper I would not care to discuss, but there are others that I would. I made a memorandum of the things that interested me as I went through it. I believe any plan, no matter what it may be, adopted by a gas manager for increasing his business will be at least fairly successful if he is interested in it. On the other hand, if he adopts a plan in which he has no interest it will not be successful. I think Mr. Wheeler is hardly justified in assuming, as he does in the first paragraph of his paper, that all progressive managers have had the same experience that he has had. I think there are some exceptions to that rule. The first consideration in selling any commodity is that it shall give satisfaction, or to have already given satisfaction before it was put in use. In lighting I think we can come nearer pleasing the people; that is, the standard of displeasure and of pleasure does not cover so wide a range as is the range in the use of fuel gas. Gas for cooking may be made a perfect failure; and so I think that the first consideration in any stove campaign is that every stove introduced shall give satisfaction. The second consideration—and so on down to about the tenth consideration—it is that the stoves already put out must be made to give satisfaction. Whatever defect a stove may have it must be cured, even if it takes a new stove, or three new stoves right in succession. Even if it is an imaginary com-

plaint it must still be cured, for to many an imaginary complaint is just as serious as a real complaint. There are many imaginary complaints. Many consumers will use $6, $8, or $10 worth of gas per month in a stove when half the quantity could be made to do the work. I believe I would rather operate a gas works in a town that was made up almost entirely of small consumers. I think Mr. Wheeler's point is that 100 consumers using 1,100 feet per month are not so liable to desert you as one large consumer burning the same amount of gas. I think there would not be as much with the smaller consumers as with the larger consumers. But still they are not all going to close down at once—they are not all going to put in individual plants, and there are many reasons why they would be more desirable. I think, however, that we can and should treat our large consumers well. Many of them can furnish light pretty cheaply themselves, and there is always the chance that they may furnish their own light. As far as piping houses is concerned, and putting in free services, I only want to refer to it in so far as to say that if you make gas popular enough the landlords have got to pipe their houses and put in services. Of course it is not so in the poorest tenement houses, but if tenants want gas bad enough they can force the landlords to put it in. I think Mr. Wheeler's ideas in advertising are very good. I believe in advertising in almost every conceivable form. You cannot hope to reach all classes by any one class of advertisement. One class of advertising that is worth all the others put together is newspaper advertising. I have often taken a theater programme, or a billposter, or some method of advertising similar to that, and I have made the best estimate possible on the number of people who would see such an advertisement. I have reduced it down to possibilities per unit of space. I find that newspaper advertising at the regular rates is just about 20 per cent. of the cost per unit of opportunity of any other class of advertising. And it certainly is the class of advertising that gives the business the best standing, and it is certainly more apt to put the gas company on a friendly footing with the newspapers. I like to have the friendship of the newspapers. I think we all feel that it is a nice thing, not particularly to have the friendship of the newspapers so much as to make them feel that they want to accord fair treatment all around. If they will give me that I am satisfied. I want to feel that I can approach them and talk things over with them freely—at least in all things that concern the newspapers of the city. I have always been interested in reaching more thoroughly than has been generally done the population within reach of the gas company. As I said at the meeting of the Ohio Gas Light Association, take "Brown's Directory" and you will find that the cities of the United States have a consumption of gas varying from 200 feet to 8,000 feet per capita; and you will find that in cities similarly situated, and where the conditions are apparently the same, one city will show 1,000 feet per capita while the consumption in another will show 3,000 feet. One reason for that difference is the way in which the campaigns for increased sales have been conducted. Again, in estimating the ability of any company to obtain new consumers, we must compare it with some other company and with some other method, in order to determine which is the best method; and not assume because one method shows good results that another will not show just as good results. In a company the work of which I have authority to map out, I make it a point to know every house in the city, who owns it, who lives in it, where the owner lives if he does not occupy it, what they use for lighting, and whether the house is piped. I can give any such information about every house in the city, and I can tell whether it is on a street main or not. While the system may seem rather elaborate, I am quite sure it pays in this particular case. My views about the advisability of a liberal policy were expressed very fully in a paper[1] which I read last fall at the Niagara meeting of the American Gas Light Association.

At this point in the discussion Vice-President McDonald assumed the Chair, and President Copley said:

In addition to the two requirements that Mr. Wheeler mentions, I would suggest that intelligence and activity are of equal importance. Human nature is pretty much all alike. My experience has been that different methods are required to get at different kinds and classes of people. I cannot agree with Mr. Doherty in his suggestion that differences in consumption are only to be reconciled on the basis of difference in management. I am absolutely certain, from my own experience, there are differences in the gas consuming possibilities of the populations of two adjoining towns; or, at any rate, differences in the readiness with which the education to consume gas can be accomplished as between those people. And there are also in addition to those differences, differences in habit and in character. Some cities of small size, or of less than 50,000 population, are more metropolitan than others. A capital city is much more metropolitan than a little village. It is much more easy to develop in a metropolitan city, or in a city where the general mass of the public is well-to do and thrifty, and in which its industries are in the nature to beget thrift, than if they are in the nature to beget extravagance. In such a city it is much easier to develop the gas business and much easier to develop this education. I do not wish to be understood as saying that other cities cannot be developed to an equal degree; but, starting at a given point four or five years ago, I mean to say that, in the relative records which two men can make, the character of the population and the habits of the people in those towns are very important factors. I agree with Mr. Doherty in the attitude always assumed by him before the different Associations that people do not appreciate so highly that which they can get free. Mr. Wheeler has attempted to avoid the idea that his consumers may get something free by saying that he charges them in advance; but, with reference to the character of the trade which he is after and which he describes, I would like to ask him how long he thinks it would take that poor woman who brought in an accumulation of nickels, amounting to $1 for the month, to pay for lighting her house and pay for her gas stove. That it seems to me is the great stumbling block. And so far as I know human nature in that class of people, who are in many instances the best class of consumers (I do not intend to say in all, because no man can pass upon that in general terms), it is much easier for them to pay $1 per week or $2.50 per month on their stove bill and to pay for the gas as the bills come along. With the raising of a sum sufficient to install a gas stove, the piping and fixtures in advance, even though you credit them with that amount of gas, or with the amount of gas represented by that sum, that of itself must prove a stumbling block in a great many instances. On the other hand, you may find enough instances in which you can get consumers who can and will pay under such circumstances, that that plan may be the best one for you to follow until you have hoed out that class in your city. But sooner or later that class must become exhausted, and then how is this poor woman with her neighbors going to raise $30 or $35, or even $20 in cash, with which to pay for piping the house and the gas stove as well in advance? Do you not think, Mr. Wheeler, that ultimately a time will come when you will have to adopt the policy of giving to these people that same thing in another form—in installments?

Mr. Wheeler—We are doing that now. No woman would ever pay out that amount at once. We don't propose to take all that they have.

Mr. Copley—Then they do not pay you in advance for that much gas?

Mr. Wheeler—They do, but they do not pay that much at first.

Mr. Copley—Then they do not pay in advance. For instance, you pipe the house for $12.60. In addition the consumer must pay the cost of a stove, if he is to use gas for fuel. Now if he does not pay for that in advance, he must pay some considerable sum for the first two or three months, and, therefore, he does not carry out your theory of paying in advance.

Mr. Wheeler—Very rarely, as a rule, do they pay for two things at the same time. Sometimes a man may pay $6 for the piping, then in three or four weeks he may buy a hot plate or something of that kind, or he may buy a range.

Mr. Copley—I do not wish to be understood as criticising your plan or your paper, but I wish to say that I do not think your analysis of the situation has been complete. It has been most complete and most satisfactory from the standpoint of yourself and of your company, as your record shows, but the time will come when other methods will be a necessity. And I am sure that the same intelligence and activity which you have shown will demand that you ultimately find other methods of securing consumers.

Mr. Wheeler—That is also true, and I am glad to have Mr. Copley express himself in that way. We make these propositions for a definite period of time, limiting it strictly to the present, and if in that time we can sell gas to 600 new consumers, the people will have been educated to the use of gas and we shall have accomplished something worth the effort. Their neighbors will then be educated also. That is the plan we intend to adopt, and that is the result we think we shall accomplish.

Mr. Doherty—Mr. Copley did not catch the remark with which I qualified my statement at the start, "With all conditions the same." To set myself straight in the eyes of the convention, and also to emphasize what Mr. Copley said, I will say that there is the widest possible difference between two towns that are apparently just the same. I do not think any man here in the room can tell how much gas any one town burns by driving around the city, meeting men at the clubs, and

1. See JOURNAL, Oct. 31, 1898, p. 634.

meeting the working men at the factory. There are some conditions, however, which seem to mark some towns as good gas towns, and others as bad ones. They differ both for fuel and for illuminating purposes. Some towns are satisfied with 16-candle power lights, while in other towns the shopkeepers will insist upon the whole window being bordered with electric lights. But I do think that sales of gas are due more to the personality of the management than to any other single factor.

Mr. Odiorne—I think the more you do for the public free of cost, the more exacting they become, and the more they expect. If you follow it up you will never know just when you will get through.

Mr. Geo. McMillan—I greatly enjoyed that paper, for it gives a great many valuable points, some of which we have had a little experience with. One point on which I disagree with Mr. Wheeler is as to free piping. I doubt very much whether it pays to do piping free; that is, to do it indiscriminately. There may be cases where it will pay well enough, and the manager must judge as to those particular cases; but if you simply advertise "free piping," I think there will be found many people who will pipe their houses. If you give stoves or even hot plates free you will find that they will have their houses piped, and they will take the stoves or the hot plates, and yet perhaps in the next three years you do not get enough from the gas consumed to bring back the capital you have expended there. That has been my experience. But if you adopt the liberal policy which Mr. Doherty has suggested I think you will be doing the wisest thing. At whatever cost you must gain the goodwill of the people with whom you are doing business; I think that will always pay. To attempt to do business against adverse criticism and bad feeling against the gas company is uphill work. If we get the people with us, if we satisfy them that they are getting value received when they are dealing with the gas company, that will go very far towards making a successful business. There is no question but that thorough canvassing and pushing the business all the time will succeed. It has been said there are differences in communities and cities, and that the same number of population does not necessarily determine the quantity of gas that will be consumed in two different cities. That is true; but where you take a city which has been under bad management, and then, under a different management, double or treble the business of that city—as has been done many times—it shows that good management has very much to do with success in the gas business. Without it there must be failure. The time has gone by when we can sit in the office and take the business that comes to us. Some of us have been long enough in the business to remember when that was done; but those days have passed away. It seems to me it pays to advertise and to do everything we can to gain the goodwill of the people and keep the gas company constantly before them. In that way we will ultimately gain success.

Mr. Whipple—In 1895 I started a scheme to give away stoves. The year before I had only sold 46. We then had out between 500 and 600 stoves in the city. In 1895 I advertised that if anybody would pay me the list price for a stove I would set the stove and give that amount of gas. In that year I sold nearly three times the number of stoves that I did the year before, and I have kept it up ever since. I have had some discussion with gas men upon that point, and with people who occupy the position that Mr. Copley does, and so this year I have done away with this plan and am now selling my gas stoves at a little below cost. I am not giving away anything at all, except that I sell the stoves below cost; but they do not know it. I have not had quite as great success this year as I had in former years. I think that whatever effort is made with regard to selling gas fixtures and stoves, the real point is to get the price of gas as low as you can possibly get it so as to compete with gasoline, and then convince the people that it is cheap. Then I think you will have no trouble in selling gas fixtures and stoves; and whether you make $2 or $3 of profit, or sell at a few dollars below cost, you will be able to satisfy the people that they are getting something for their money. Then I think the rest will follow. Mr. Wheeler's paper suggests something to me with regard to services. I am using service cards, and it struck me that we might use them to keep track of services that are not in use, and that if we had a card index one drawer could hold cards of services that are used and another could hold cards of services which are not used. Then by rapidly running over one drawer or the other you could see exactly where your canvasser could go to work with advantage. That is something on the order of what Mr. Wheeler has done with his canvassers, but I have reference more particularly to the point that there are in all cities a great many services which are not in use for one reason or another, and there is need of some system being devised to take care of that department. I believe with Mr. Doherty as to the advantages of advertising. I have spent a great deal of money in advertising, and I do not believe in taking a small space in a newspaper. I think you might just as well throw your money away as take only a one or two inch space advertisement. I believe in a six-inch or double six, or a double eight-inch space—something which will attract attention. A question is suggested to me by the remark that we should not use these plans to increase the business until the town is worked out. How can you tell whether your town is worked out or not?

Mr. Howard—It struck me, while listening to the inducements that Mr. Wheeler would offer to consumers by saying, "I will do your piping free;" "I will furnish your fixtures free;" "I will put in your services free," whether, if a gas company can afford to do all that and can still make a profit, the consumers will not be very apt to think that the price of gas is a little too high, and will they not be clamoring for another reduction? (Applause.)

Mr. Miller—That is exactly a point I had in mind. At Fort Worth they began the free service business, and it appeared at the time, as a great many free services were in that were only used for a month or so, there was a good deal of loss to the Company, not only in the cost of the services, but there was a loss of gas because of leaky services, in order to follow on the line of progression, we decided to put services. In and to charge the regular price for them, and let them pay for the services, but we offered them a rebate of 30 cents per 1,000 (gross $2, net $1.70), and for every $2 that they paid on account of the services we would give them 1,000 feet of gas. We would only allow them in so many months so many thousand feet of gas, but they must consume at the rate of 1,000 feet per month. They would sometimes say, "I will burn gas when I get ready." I would reply, "If you cannot afford to burn 1,000 feet per month we cannot afford to give you the service." We found the plan worked satisfactorily. As soon as a service is put in we have a card drawn up entitling them to so many thousand feet of gas, if consumed by a certain date. At the end of the month we place upon the back of the card so many feet of gas consumed, receipt the bill and send it to the customer. At the expiration of the time for which they paid for the gas they are waited on for the rest of the deposit, and that deposit is collected or a slot meter goes in. We find our slot meters are increasing constantly. I think last year we had only 100; now we have 500.

The Chairman—We would like to hear a word from Mr. McClary, of Chicago.

Mr. McClary—I do not know that I can add anything to what has been already said. It seems to me, from what I know about the gas business, that the question as to what is the best means of promoting business is largely a local one. What is intelligent promotion for one town may not be for another. Towns are very different. It would be ridiculous to apply the same methods in a small detached manufacturing town which you would use in a suburban town; or in a southern town those which you would employ in a northern town. It seems to me Mr. Copley has stated very concisely what a gas manager should be and do. He should make a careful study of the conditions as they exist in his town, and then act intelligently in respect to those conditions. He should, however, have one qualification which has not been mentioned here, and I think it is worth while for us all to bear the fact in mind—that it is not only the duty of the gas manager to sell gas, and to reach all classes of the public, but it is also his duty to educate his directors. A mere statement that he thinks it is best to do so and so, backed up by showing how much money it will take, is very apt to be turned down. He has not fulfilled his duty to his company in any degree if he stops there. He should be so completely imbued with the subject, and should have statistics, facts and figures so completely at his hand, as to be able to lay the matter before them in an attractive form and cause them to allow him whatever leeway he requires in this kind of promotion of the business of the company. I think some have lost sight of that. I have heard gas managers say that they would like to do so and so, but that the owners of the company did not think that it would be wise. I have always thought it was the fault of the manager. His is the end which must be taken up first. The question of the advisability of requiring payment in advance for gas fixtures and for stoves has been discussed, and I may say that I have been connected with companies that tried both plans. I think it is largely a local question. A company starting in a new territory had better find a way of getting out some gas meters that will make immediate returns, but at the same time the best part of the community is quickly covered in that way. It is also true that people who are not very well-to-do do not look so much to the advantage of paying in advance for a certain amount of gas, $25 or $30, or whatever may be the price of a stove. Unfortunately they do not look as far ahead as that. What they do look at is the offer of an easy way of getting hold of a range. It is well as a general policy to be liberal with reference to fixtures, but is also well to sell ranges on a plan which will enable a woman to buy a range out of her weekly allowance and without going to her husband. Wives usually have an allowance, and by making the required

payments very small, and by adopting a form of contract something like the rental contract, so that when they pay in rentals an amount equal to the price of the stove it becomes theirs, we have no trouble at the inception, and in most cases the payments are kept up. In small towns you can make those payments the same, first and last; but in large cities it is not practicable, and there we find it necessary to make the first payment somewhat larger. We are selling ranges at Alton, Ills., for half the catalogue price, and we make the first payment on a $12 range $2, and after that $1. This is stamped right on the gas bill. No separate books are kept of that, but a rubber stamp is made use of for putting it on the ledger sheet so as not to require any more book-keeping. The entry is in the nature of a memorandum and the account is very easily kept in that way. That plan is practiced because it is easily started, and because nearly all housewives can in that way take a range without consulting their husbands.

The Chairman—This is unquestionably a very valuable discussion and one which I hope will be generally participated in. I can recall the time when gas was regarded as a luxury, but I have no doubt it is now rapidly becoming the light of necessity and the fuel of necessity. What we are all interested in is getting the poorer people to use it more generally.

Mr. Callender—I am in a small town in which last summer we had 14 gas ranges. By running services free, putting in a 4 hole gas range, making connections and putting up one jet of gas for $13, the Company has been able to put in and connect 70 gas ranges since the 15th of March. We make the price to the consumer at the rate of $13 for the same services, payable at the rate of $1 per month.

Mr. Murdock—I have heard a great deal about selling gas to build up fuel consumption, but I have not heard very much about the lighting interest. We were very successful in our town with the Welsbach light. We chiefly rent them. When the rental accumulates we apply it on the burner. We find that it is a very successful way of introducing Welsbach lights.

Mr. Doherty—Mr. Whipple spoke a few moments ago about the price of gas. I honestly believe that the consumer in a community who is getting gas for $1.25 per 1,000, where complaints are well taken care of, is getting cheaper gas than is the one getting gas for $1, where no attention is paid to his needs. We are really selling light and heat, and if the incandescent gas lamps are going to prevail it is soon going to be a question of heat. Now the average consumer who is using open top flames with the ordinary fixture globes, and is paying $1 per 1,000 for his gas, is paying more than the man who is using an imitation candle. That is, he is paying more per unit of light. As far as stoves go, it is a mere matter of education. To-day the gas stove business is such that pretty nearly every factory makes stoves which are not greatly different in economical results from several others; but as to matter of instruction, there are many servants who do not know that when water is boiling you cannot get it any hotter. There are many other points of that sort that they need to be drilled on. The manager who takes care of the complaints properly will realize great sales and can eventually reduce the price of his gas much lower than can the man who does not pay such close attention to complaints because he has put his price so low that he feels that he cannot take care of his consumers. I find that the people who have to save money on gas stoves, and mechanics whose wives do their own work, are our best customers. We sell lots of stoves to laborers who pay for them on the installment plan; and I would sooner undertake to sell a stove on the installment plan, which is so attractive generally, at $25, than undertake to sell a $5 stove on the spot cash plan. What I started to say was I find these women who are now buying stoves are able to cook for a whole month on a gas bill so low that any four stoves that are put out now, from point of consumption, are not worth one of our older consumers. It is not an unusual thing for a cooking stove bill to run as low as $1 per month, where cooking has been done for a large family and where there is no other means of cooking except the gas stove. I made some averages—I do not think I can recall them—but I think that when I first became acquainted with the Madison gas works the average gas bill for cooking was over $3 per month. In spite of the fact that we have added a great many water heaters, the average now is below $2 per stove. Last year we sold about 400 gas stoves, and 80 per cent. of those went to the poorer classes, in fact to a very poor class, for some went to people who live in what we would call huts; in fact five or six of them live in what are really nothing but huts, of two or three rooms, set on stilts in the marsh. Our returns from those stoves are so small as to be almost discouraging. But still it is encouraging from the fact that they all like gas and recommend it. We expect to sell 400 more stoves this year—we have already sold 179, and our gas stove season opened up only about two weeks ago. That is, we did not commence to get orders for the connections and ranges until then. I am a crank on the subject of taking care of complaints. I do not think there is any other one thing so necessary as that. I believe the use of gasoline can be reduced very considerably by proper attention to the stove business, and if the servant or operator can be properly instructed, especially if that operator is the housewife and not a servant.

The Chairman—Mr. Miller has sent up this question: "Is there any valid reason for having the fuel rate lower than the illuminating rate, where the day sendout becomes equal to the night sendout?" Will Mr. Doherty answer that?

Mr. Doherty—I would say, if your day sendout is equal to the night sendout you are not getting as high a rate of sendout as you do on the night sendout. I know of one city which has a bigger sendout in the daytime than at night; but their maximum momentary demand is at night. They have three peaks in the day load, the breakfast peak, the dinner peak and the supper peak. There is but one peak to the night load, and while the volume sent out is less than the day sendout, the maximum demand is greater. There is another matter for consideration in regard to fuel rates, and that is competition. I can take gas at $2 per 1,000 and compete with electricity if I furnish the Welsbach light (no matter how low it is sold, within reason, and much lower than it is sold now); but when gas has to compete with other means of cooking we have to meet that. The lot of any customer is better, even though he uses no gas for fuel, if companies fixed charges are partially supported by the sales of fuel gas at a lesser rate.

The further discussion of the paper was put over to the next session, and a motion to adjourn until 10 A.M. of the following day was adopted.

(To be Continued.)

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. W. H. WARD has resigned the Superintendency of the Easton (Pa.) Gas Company. We hope that his successor will do as good work for the Company as that performed by Mr. Ward during his long and successful direction of its affairs.

THE Lewiston (Me.) Gas Light Company's proprietors are quite well satisfied over the results in output which have followed the extension of the main system. Many gas cookers have been put on the lines.

THE Berlin Iron Bridge Company, of East Berlin, Conn., has been awarded a contract for an extension to the factory building of the Port Chester (N. Y.) Bolt and Nut Company. The extension is to be 32 feet wide and 125 feet long, and in construction it will be similar to the building erected for the Port Chester Company by the Bridge Company some time ago. The supporting trusses and columns are to be of steel, and the roof is to be of weave-shed form, having a glass exposure on the north, to insure ample lighting from the proper direction.

THE proprietors of the Burlington (N. J.) Gas Light Company have reduced the selling rate to $1.50 per 1,000 cubic feet. The former gross rate was $2.

A CORRESPONDENT in Atlanta, Ga., forwards the following: "The transfer of the stock of the Gas Light Company of Augusta, Ga., has been completed. The Georgia Railroad Bank acted as the fiscal agent for the purchasers, Col. D. B. Dyer and others. This foreshadows the end of the gas war in Augusta, which has been on for six months or more, although the Company which Mr. Paul Langford has been trying to organize, and whose application for a charter and franchise right is still before the authorities, remains an uncertain quantity. However, for the present the gas war is ended, and the net result is the transfer of the ownership in the Company from local to outside capitalists, a reduction in the price of gas from $1.50 to $1.25 per 1,000 cubic feet, and the extension of the gas supply to the West End district."

THE Los Angeles (Cal.) Suburban Gas Company has been incorporated by Messrs. T. S. C. Lowe, Leon P. Lowe, Sobieski Lowe, Thaddeus Lowe and Lynn Helme. It is capitalized in $500,000, the majority of which is presumably held by the Lowe family.

SOME days ago, Superintendent Fancher, of the New Haven (Conn.) Fire Department, received a check for $100 from the New Haven Gas Light Company, which was made payable to the Firemen's Benefit Association. The check was accompanied by a letter reciting the appreciation of the Company for the satisfactory efforts of the firemen in connection with the conflagration of the Stowe Lumber Company's barn, which was close to the works of the Gas Light Company.

MR. PRYCE W. BAILEY has been appointed Superintendent of the Seneca Falls and Waterloo (N. Y.) Gas Light Company, vice Mr. R. J. Dobson.

EARLY last month the laborers (two in number) in the gas works at San Juan, Porto Rico, declined to work because their demand for higher wages had been refused. The Chief of Police, Senor Jose Maturano, was called upon to arbitrate the case, and his pleas were so successful that the strike was declared off.

THE Council of Rangitikei county, New Zealand, has placed an order with the Berlin Iron Bridge Company, of East Berlin, Conn., for a highway bridge consisting of a single span of 204 feet, designed to carry a distributed load of 1,500 pounds per lineal foot, or a road engine weighing 40 tons. In forwarding this order the Chairman of the Council, said: "As far as I know this is the first order of the kind sent to the United States, and the experiment is being watched by other local boards." The bridge will be a pin connected structure, on account of

the ease and facility with which this class of construction can be erected in the field.

A CORRESPONDENT writes us that the new proprietors of the Gas Light Company, of Augusta, Ga., have chosen the following executive management: Directors, D. B. Dyer, W. E. Moore, C. O. Simpson, George H. Conklin and Andrew McKnight; President, D. B. Dyer; Secretary, C. F. Fleming.

THE proprietors of the Athens and Sayne (Pa.) Gas Company have awarded a contract to the United Gas Improvement Company for a set of its standard, double superheater, Lowe water gas apparatus, of a daily capacity of about 125,000 cubic feet. As noted in the JOURNAL last week the plant of the Waverly (N. Y.) Company has come into possession of the owners of the Athens Company, and as soon as the new works at Athens are completed the entire district will be supplied from Athens as a central point and the coal gas plant at Waverly will be shut down.

MANAGER CRAFTS, of the Northampton (Mass.) Gas Company, is mapping out a system of main extension intended for the supply of gas in the adjoining district of Florence.

A CORRESPONDENT incloses the following official notice issued by the Marblehead (Mass.) Gas Light Company, respecting the revised rate schedule, short mention of which has been made in the JOURNAL:

"The Marblehead Gas Light Company has recently come under a new management, and it will be the object of the management to deal with customers on an equitable basis. The general policy of the Company will be to reduce the price of gas to consumers as fast as the consumption and conditions will warrant. The first reduction will be made by making the gross price $2.50 per 1,000 feet, instead of $3 as at present, with a reduction on all bills settled before the 15th of the month. On and after July 1st, prices of gas will be as follows: Maximum price, $2.50 per 1,000 feet. On all bills amounting to $1 or less, net. All bills amounting to from $1 to $15 per month, 12½ per cent. discount, making the net price $2.19 per 1,000 feet. All bills from $15 and upwards, as well as for gas consumed in gas engines, 20 per cent. discount, making net price $2.

"We shall supply gas stoves at cost to us. Stoves connected with pipe in house free of charge. A trial of gas at these prices will convince anyone of its small cost and great convenience; not only for lighting but for cooking and heating. Mantles for Welsbach lights supplied for 15 cents each. Any complaint as to the quality of the gas or the service will receive respectful attention, if addressed to the Superintendent.—J. E. Aldred, Pres.; C. H. Allen, Supt."

THE revised selling schedule, at Racine, Wis., as put out by Mr. H. H. Hyde, Manager of the Company, is as follows: On illuminating account, $1.20 per 1,000; for fuel use, $1 per 1,000.

MR DUNCAN JONES, Secretary of the New Orleans Gas Light Company, has notified the shareholders that a dividend of $2.50 per share is payable on and after the 15th inst.

IT is said that the New England Gas and Coke Company will not begin the distribution of gas to the Boston gas companies, "until the entire plant is completed in the fall?" Until?

PAPERS announcing certain changes in the Pekin (Ills.) Gas Light Company have been filed. Hereafter the concern is to be known as the Pekin Light, Heat and Power Company, and its corporate powers admit of "the use of air, gas, electricity, steam or hot water for any and all purposes to which the same may be applied."

THE local authorities of Winston, N. C., have granted a franchise to the Winston-Salem Gas Lighting Company, under which its proprietors are empowered "to construct, own, maintain and operate, for a period of 30 years, a plant for the manufacture, production, lease and sale of light, heat and power, made from or by the use of gas, electricity, coal oil, steam or water in the city of Winston, and to supply the citizens there with the products of said plant on such terms as may be agreed upon."

WINSTON is the capital of Forsyth county, North Carolina, and is about 35 miles northeast of Salisbury, on the Winston-Salem division of the Norfolk and Western Railway. It harbors manufactures of cotton, wool, iron and tobacco, and is altogether quite a busy place. Population about 10,000, of whom perhaps 4,000 are not white. Salem, its close neighbor, being only one-half mile away, is also a busy place with a population of about 3,500. From our point of view a gas works in Winston-Salem should pay.

THE Berlin Iron Bridge Company reports that it is under contract to construct for the Armstrong Mfg. Company, at Bridgeport, Conn., a fireproof storehouse. The building, which is to have the dimension of 40 feet by 60 feet, is to have a framework of steel, and its covering is to be of corrugated iron lined with the Bridge Company's patent anti-condensation fireproof roof lining. The builders say that the construction is to be of the absolutely fireproof order.

THE scheme for the organization of an opposition gas works in Atlantic City, N. J., looks to be irretrievably buried. The black-eyed Mayor of Trenton, Mr. Syckel, was concerned in the scheme.

THE properties of the Raleigh (N. C.) Gas Company have again changed hands. This time the Company is to be managed by local capitalists, prominent amongst whom are Messrs. B. S. Jerman, Wm. Grimes, Jno. R. Ferrall, G. Rosenthal, H. W. Jackson and M. T. Leach, of Raleigh; and J. S. Carr and L. A. Carr, of Durham. The works will be rebuilt.

A NEW incorporation, to be known as the Standard Gas Company, of New Brunswick, N. J., has filed its articles. The capital stock is $150,000, of which $30,000 is said to have been paid up. Its objects are the manufacture and sale of gas for lighting, heating and power purposes, and its headquarters are to be at 39 Park street, Orange, N. J. The incorporators are Messrs. C. M. Trivett and Joseph F. Preston, of New York; and Robt. Gilchrist, of Elizabeth, N. J.

JUDGE HARDY, of the Superior Court, has granted the petition of Mr. R. B. Dodge, Jr., as receiver of the Spencer (Mass.) Gas Company, for permission to sell the property for the benefit of its creditors. The decree having been filed Mr. Dodge sold the Company's possessions to the Citizens Gas Company, of Spencer, at its bid of $70,000. This we hope ends the perplexities in which the Spencer Company has been so long involved.

AT the annual meeting of the San Jose (Cal.) Light, Power and Heating Company the following officers were chosen: Directors, C. W. Quilty, Lloyd Tevis, Gus. Lion, Amasa Eaton, J. K. Prior, J. Leiter and Uriah Wood; President, C. W. Quilty; Vice-President, Gus. Lion: Secretary, J. B. Clark; Treasurer, the Bank of San Jose.

LAKEVILLE, Conn., wants a gas works, but it is extremely doubtful if such an enterprise would prove profitable there.

AT a special meeting of the shareholders of the Hartford City (Conn.) Gas Light Company it was decided to accept the amendments to its charter, under the permission of the last General Assembly, by virtue of which the Company may legally supply gas in the towns of Wethersfield, West Hartford and Windsor, and to increase its capital stock "to a sum not exceeding in the whole the sum of $1,000,000."

THE Court of Appeals, of the State of Maryland, in a decision by Judge Fowler, in the case of John A. Blondell and John J. Myers against the Consolidated Gas Company, of Baltimore, holds that governors cannot be placed on gas meters without the consent of the Gas Company, as the meters are the property of the Company; but the Court also holds that governors may be placed on the end of the consumers' pipe nearest the meter.

THE trustees for the bondholders of the Spring City and Royersford (Pa.) Gas Company have been authorized to sell the property at auction in Philadelphia the 1st prox.

THE last quarterly dividend of the Cincinnati Gas Light and Coke Company, which was made payable the 1st inst., is at the rate of 8 per cent. per annum. For many years the Company's annual dividend has been at the rate of 10 per cent. per annum.

GENERAL MANAGER STRONG, of the Consolidated Gas Company, of Long Branch, N. J., has about completed many important betterments on the electric division of the plant, chiefly in the generating department. The gas section of the Company shows a marked increase in sendout, which increase is largely attributable to the demand for gas cookers, over 200 of these steady gas takers having been placed up to June 15.

ON the 6th inst. the shareholders of the Buffalo (N. Y.) Gas Light Company will vote upon a certain agreement heretofore arranged by the Directors of the Buffalo Gas Light Company and the Buffalo City Gas Company, for the merging into a single corporation of the named Companies.

THE Raritan Copper Company has arranged for the construction of a new furnace building in connection with its plant at Perth Amboy, N. J. The contract for it has been placed with the Berlin Iron Bridge Company. The structure is to be 90 feet wide, 130 feet long and 22 feet high, and is to be constructed entirely of steel. It is to be equipped with traveling cranes, runways, etc.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
MANAGER.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 32 Pine Street, New York.

The JOURNAL is the official organ of the
NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.
AMERICAN GAS LIGHT ASSOCIATION.
WESTERN GAS ASSOCIATION.
OHIO GAS LIGHT ASSOCIATION.
PACIFIC COAST GAS ASSOCIATION.

TERMS:

SUBSCRIPTION—Three Dollars per annum, in advance. Single copies, 10 Cents.

Notification Respecting Advertising.—Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, JULY 3, 1899.

The Market for Gas Securities.

The gas war is still being waged, and all the commanding officers of the many field divisions are satisfied that victory is to be theirs. The rank and file of the shareholding regiments, however, are wondering what sort of position they will occupy when the flag of truce is unfurled. They should rest satisfied, if they can hold on to their stock, that their share in the spoils will equal in percentage that of the officers. Consolidated sold up to 189½ yesterday (Thursday) and at noon to-day the price was 187½ to 188½.

Other city gas shares were strong, excepting Mutual, 200 shares of which were reported sold at auction at 275½. This nominal slump is attributable to the action of the Directors in declining to declare the usual extra dividend of 1 per cent. for the first half of the year. The Company for some years has paid a regular semi-annual dividend of 3 per cent., with 1 per cent. extra in July and 2 per cent. extra in January. New Amsterdam common is 35½ to 35¾, and the preferred is 61 to 62. The bonds are also in fair demand at better prices. The Standard securities show no change.

Brooklyn Union moved up sharply to 141½, and the likelihood is that its value from a market point of view will steadily increase. As has often been said in these columns, the position of the Company is almost unassailable. The Cincinnati (O.) Company has reduced its dividend rate per annum from 10 to 8 per cent., but shareholders should bear in mind that this action is in the nature of precaution. The shares are nominally quoted at 175 to 180.

Peoples, of Chicago, is strong, at a mark well above 119. Bay State is 2½ to 2¾, and Consolidated, of Baltimore, shows no particular change. Washington (D. C.) is again beyond the 250 point, holders asking 265, with 260 bid for it. A stock on the list which seems to offer an excellent opportunity for investment and speculative gain, is Western, of Milwaukee. It is worth intrinsically to-day 125.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JULY 3.

☞ All communications will receive particular attention
☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$39,078,000	100	187½	188
Central Union, Bonds, 5's.	3,000,000	1,000	107½	108½
Equitable Bonds, 6's	1,000,000	1,000	105	.
" 1st Con. 5's	2,300,000	1,000	115	118
Metropolitan Bonds	658.000	.	108	112
Mutual	3,500,000	100	250	..
" Bonds	1,500.000	1,000	100	102
Municipal Bonds	750.000	.	.	
New Amsterdam Gas Co.	13,000,000	100	35¼	35¾
Preferred	10,000,000	100	61	62
Bonds, 5's	11,000,000	1,000	100½	101
Northern Union, Bonds, 5's.	1,250,000	1,000	95	97
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	109	111
" 1st Con. 5's	1,500,000		112	114
Richmond Co., S. I.	348.650	50	70	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	110	..
Preferred	5,000,000	100	127	..
Bonds, 1st Mortgage, 5's	1,500,000	1,000	112	114
Yonkers	299,65	500	130	
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	141	142
" " Bonds (5's)	15 000,000	1,000	118	119
Bay State	50,000,000	50	2¼	2⅝
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	40	..
" 1st Mtg. 5's	450,000	1,000	95	98
Boston United Gas Co.—				
1s Series S. F. Trust	7,000,000	1,000	92	..
2d " " "	3,000,000	1,000	68	71
Buffalo City Gas Co.	5,500,000	100	10	11
" " Bonds, 5's	5,250,000	1,000	84	85
Central, San Francisco	2,000,000	..	105	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Columbus	1,144,700	100	70	75
1st Mortgage	1,207,000	1,000	106	108
Consumers. Jersey City	2,000,000	100	95	.
" Bonds	600,090	1,000	107½	110
Cincinnati G. & C. Co.	8,500,000	100	175	180
Consumers, Toronto	1,700,000	50	230	235
Capital, Sacramento	500,000	50	..	85
Bonds (6's)	150,000	1,000	..	..
Consolidated, Baltimore	11,000,000	100	61¼	62⅛
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	21	23
" Con. Mtg. 5's	380,000	1,000	87	90
Consolidated G. & E. Co.'s, Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co.	4,560,000	50	63	65½
" Prior Lien 5's	4,546,000	1,000	94¼	94½
Detroit Gas Co., 5's	423,000	1,000	95½	96
" Inc. 5's	31,000	100	..	..
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Fort Wayne	2,000,000	..	77	83
" Bonds	2,000,000	..	80	85
Grand Rapids Gas Lt. Co.	1,000,000	50	..	..
" 1st Mtg. 5's	1,125,000	1,000	..	..
Hartford	750,000	25	..	220
Indianapolis	2,000,000	..	122	128
" Bonds, 6's	2 650,000	..	105	106
Jackson Gas Co.	250,000	50	50	..
" 1st Mtg. 5's	250,000	1,000	96	100
Jersey City	750,000	20	225	275
Lafayette Gas Co., Ind.	1,000,000	100	68	70
Bonds	1,000,000	1,000	81	86
Louisville	2,570,000	50	106	108
Laclede, St. Louis	7,500,000	100	53	..
Preferred	2,500,000	100	98	100
Bonds	10,000,000	1,000	107	108
Madison Gas & Elec. Co.	400,000	100	68	70
" 1st Mtg. 6's	350,000	1,000	102	..
Montreal, Canada	2,000,000	100	200	..
Newark, N. J., Gas Co.	1,000,000	..	200	220
Bonds, 6's	4,000,000	..	128	130x
New Haven	1,000,000	25	280	300
Nashville Gas Lt. Co.	1,000,000	50	110	..
Oakland, Cal.	2,000,000	..	53½	55
" Bonds	750.000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	119½	120
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	111½	112
2d "	2,500,000	1,000	104	105
Peoples, Jersey City	500,000	50	215	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	74	75
St. Paul Gas Light Co.	1,500,000	100	30	32
1st Mortgage 6's	650,000	1,000	82	85
Extension, 6's	600,000	1,000	..	..
General Mortgage, 5's	2,428,000	1,000	80	82
St. Joseph Gas Co.	1,000,000	100	42	44
" 1st Mtg. 5's	750,000	1,000	96	99
Syracuse, N. Y.	1,750.000	100	12	14
Bonds	1,612 000	1,000	81	84
Washington, D. C	2,000,000	20	260	265
First mortgage 6's	600,000		..	..
Western, Milwaukee	4,000,000	100	99	100
Bonds, 5's	3,830,500	.	106	108
Wilmington, Del.	550.000		208	..

Advertisers' Index.

GAS ENGINEERS.

	Page
Wm. Henry White, New York City	35
Fred. Bredel, Milwaukee, Wis.	22
Geo. R. Rowland, New York City	19
The Western Gas Construction Co., Fort Wayne, Ind.	40
Humphreys & Glasgow, New York City	20
American Gas Co., Phila., Pa.	22
David Leavitt Hough, New York City	32
Economical Gas Apparatus Construct'n Co., Toronto, Ont.	24
Baxter & Young, Detroit, Mich	32
United Gas Improvement Co., Phila., Pa	27
James T. Lynn, Detroit, Mich	32
A. E. Boardman, Brevard, N. C.	32
Gilbert & Barker Mfg. Co., New York City	18

PROCESSES.

	Page
Bartlett, Hayward & Co., Baltimore, Md.	33
United Gas Improvement Co., Phila., Pa.	27
Burdett Loomis, Hartford, Conn.	34
National Gas and Water Co., Chicago, Ills.	29
Economical Gas Apparatus Construct'n Co., Toronto, Ont.	24
The Western Gas Construction Co., Fort Wayne, Ind.	40
Humphreys & Glasgow, New York City	20
Gilbert & Barker Mfg. Co., New York City	18

GAS WORKS APPARATUS AND CONSTRUCTION.

	Page
James R. Floyd's Sons, New York City	36
Continental Iron Works, Brooklyn, N. Y.	34
Deily & Fowler, Phila., Pa.	36
Kerr Murray Mfg. Co., Fort Wayne, Ind	32
Stacey Mfg. Co., Cincinnati, Ohio	35
Bartlett, Hayward & Co., Baltimore, Md.	33
Davis and Farnum Mfg. Co., Waltham, Mass.	32
R. D. Wood & Co., Phila., Pa.	34
Isbell-Porter Company, New York City	34
Fred. Bredel, Milwaukee, Wis.	22
United Gas Improvement Co., Phila., Pa.	27
National Gas and Water Co., Chicago, Ills.	29
Economical Gas Apparatus Construct'n Co., Toronto, Ont.	24
The Western Gas Construction Co., Fort Wayne, Ind.	40
Humphreys & Glasgow, New York City	20
American Gas Co., Phila., Pa.	22
Logan Iron Works, Brooklyn, N. Y.	36
Riter-Conley Mfg. Co., Pittsburgh, Pa.	35
Baxter & Young, Detroit, Mich.	32
Berlin Iron Bridge Co., East Berlin, Conn.	21
G. Shepard Page's Sons, New York City	32
James T. Lynn, Detroit, Mich.	32
A. E. Boardman, Brevard, N. C.	32
Gilbert & Barker Mfg. Co., New York City	18

SCRUBBERS AND CONDENSERS.

R. D. Wood & Co., Phila., Pa 34
James R. Floyd's Sons, New York City 36
Continental Iron Works, Brooklyn, N. Y. 34
Logan Iron Works, Brooklyn, N. Y. 36
Riter-Conley Mfg. Co., Pittsburgh, Pa. 35

TAR AND CARBONIC ACID EXTRACTOR.

R. D. Wood & Co., Phila., Pa. 34

AMMONIA CONCENTRATORS.

Michigan Ammonia Works, Detroit, Mich. 17
American Gas Company, Phila., Pa. 22

GAS METERS.

John J. Griffin & Co., Phila., Pa. 1000
American Meter Co., New York and Philadelphia 39
Helme & McIlhenny, Phila., Pa. 39
D. McDonald & Co., Albany, N.Y. 37
Nathaniel Tufts Meter Co., Boston, Mass. 38
Maryland Meter and Mfg. Co., Baltimore, Md. 38
Metric Metal Co., Erie, Pa 39
Keystone Meter Co., Royersford, Pa. 38
Detroit Meter Company, Detroit, Mich. 39

PREPAYMENT METERS.

American Meter Co., New York and Philadelphia 39
John J. Griffin & Co., Phila., Pa. 1000
D. McDonald & Co., Albany, N. Y. 37
Helme & McIlhenny, Phila., Pa. 39
Nathaniel Tufts Meter Co., Boston, Mass. 38

GAS AND WATER PIPES.

M. J. Drummond & Co., New York City 37
R. D. Wood & Co., Phila., Pa. 34
Warren Foundry and Machine Co., New York City 37
Donaldson Iron Co., Emaus, Pa. 37
Utica Pipe Foundry Co., Utica, N. Y. 37

PIPE CUTTERS.

The Anderson Pipe Cutter Co., East Boston, Mass. 19

GAS MAIN STOPPERS.

Safety Gas Main Stopper Co., N. Y. City 19

STEAM BLOWER FOR BURNING BREEZE.

H. E. Parson, Brooklyn, N. Y. 29

GAS COALS.

Penn Gas Coal Co., Phila., Pa. 31
Perkins & Co., New York City 30
Despard Gas Coal Co., Baltimore, Md. 31
Westmoreland Coal Co., Phila., Pa. 31
Berwind-White Coal Mining Co., New York and Phila. 30

CANNEL COALS.

Perkins & Co., New York City 30
Greasy Creek Cannel Coal and Tramway Co., Chicago 18

GAS ENRICHERS.

Standard Oil Co., New York City 31
The Sun Oil Co., Pittsburgh, Pa. 31

COKE CRUSHER.

C. M. Keller, Columbus, Ind. 31

GAS GAUGES.

The Bristol Co., Waterbury, Conn. 20

GAS GOVERNORS.

Connelly Iron Sponge and Governor Co., New York City 29
Isbell-Porter Co., New York City 34
R. D. Wood & Co., Phila., Pa. 34
Wm. M. Crane Co., New York City 20

CEMENTS.

C. L. Gerould & Co., Mount Vernon, N.Y. 28

RETORTS AND FIREBRICKS.

J. H. Gautier & Co., Jersey City, N. J. 28
B. Kreischer & Sons, New York City 28
Adam Weber, New York City 28
Laclede Firebrick Mfg. Co., St. Louis, Mo. 28
Cyrus Borgner, Phila., Pa. 28
James Gardner, Jr., Pittsburgh, Pa. 28
Henry Maurer & Son, New York City 28
Baltimore Retort and Firebrick Co., Baltimore, Md. 28
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 28
Brooklyn Firebrick Works, Brooklyn, N. Y. 28

REGENERATIVE FURNACES.

Bartlett, Hayward & Co., Baltimore, Md. 33
Fred. Bredel, Milwaukee, Wis. 22
J. H. Gautier & Co., Jersey City, N. J. 28
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 28
Adam Weber New York City 28

SELF-SEALING MOUTHPIECE DOORS.

Isbell-Porter Co., New York City 34
Continental Iron Works, Brooklyn, N.Y. 34
Logan Iron Works, Brooklyn, N. Y. 36
R. D. Wood & Co., Phila., Pa. 34

INCANDESCENT GAS LAMPS.

Welsbach Commercial Co., Phila., Pa. 20

BURNERS.

C. A. Gefrorer, Phila., Pa. 34
Wm. M. Crane Co., New York City 18
D. M. Steward Mfg. Co., Chattanooga, Tenn 19

LAVA GAS TIPS.

D. M. Steward Mfg. Co., Chattanooga, Tenn. 19

STREET LAMPS.

Welsbach Street Lighting Co., New York and Phila. 24
Thos. T. W. Miner, New York City 19

PURIFYING MATERIALS.

Connelly Iron Sponge and Governor Co., New York City 29
Greenpoint Chemical Works, Brooklyn, N.Y. 29
van Baarda & Co., Dusseldorf-on-the-Rhine 29

VALVES.

Ludlow Valve Manufacturing Co., Troy, N. Y. 20
Chapman Valve Manufacturing Co., Boston, Mass. 20
R. D. Wood & Co., Phila., Pa. 34
Continental Iron Works, Brooklyn, N. Y. 34
The P. H. & F. M. Roots Co., Connersville, Ind. 23
Isbell-Porter Co., New York City 34
The Western Gas Construction Co., Fort Wayne Ind. 40

EXHAUSTERS.

The P. H. & F. M. Roots Co., Connersville, Ind. 23
Isbell-Porter Company, New York City 34
Connelly Iron Sponge and Governor Co New York City 29

ELECTRICAL APPARATUS.

Wm. Henry White, New York City 35

GAS ENGINES.

Backus Water Motor Co., Newark, N. J. 978

ENGINES AND BOILERS.

The Hazelton Boiler Company, New York City 19

PURIFIER SCREENS.

John Cabot, New York City 20

GAS STOVES.

American Meter Co., New York and Philadelphia 25
Maryland Meter and Manufacturing Co., Baltimore, Md. 38
Keystone Meter Co., Royersford, Pa. 38
Wm. M. Crane Co., New York City 20
Nathaniel Tufts Meter Co., Boston, Mass. 38

HOT WATER HEATERS.

J. P. B. Sadtler & Co., Baltimore, Md. 18
Wm. M. Crane Co., New York City 20

GASHOLDER TANKS.

J. P. Whittier, Brooklyn, N. Y. 20

GASHOLDERS.

Bartlett, Hayward & Co., Baltimore, Md. 33
Continental Iron Works, Brooklyn, N. Y. 34
Delly & Fowler, Philadelphia, Pa. 36
Davis & Farnum Mfg. Co., Waltham, Mass. 32
Kerr Murray Mfg. Co., Fort Wayne, Ind. 32
Stacey Mfg. Co., Cincinnati, Ohio 35
R. D. Wood & Co., Philadelphia, Pa. 34
Logan Iron Works, Brooklyn, N. Y. 36
Riter-Conley Mfg. Co., Pittsburgh, Pa. 35

CHEMICALS.

Emken Chemical Co., New York City 18

GAS SECURITIES.

Henry Marquand & Co., New York City 18

PATENTS.

H. S. Thornberry, Washington, D. C 37

ADVERTISING.

J. Howland Harding, New York City 18

BOOKS, ETC.

Newbigging's Handbook 984
Scientific Books 30
Digest of Gas Cases 31
Practical Photometry 28
Gas Flow Computers 31
Hughes' "Gas Works" 29
Gas Engineer's Pocket-Book 21
Excerpts from Reports of Gas Commissioners 34
Poole on Fuels 999
Binders 37

DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILA., PA., June 22, 1899.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable July 15, 1899, to stockholders of record at the close of business June 30. Checks will be mailed.

1256-2 EDWARD C. LEE, Treasurer.

WANTED.

Manager Coal Gas Company.

Modern works; 4,500 population; Northern town. Excellent opportunity for young man having requisite practical and business training. Address preliminary particulars to

1255-tf Box No. 25, Journal.

Position Wanted.

Thoroughly Competent and Up-to-Date Gas Engineer

desires position as Superintendent or Manager of a Gas Plant Best of references. Address

1238-tf "A. Z.," care this Journal

FOR SALE,

1,500 Barrels OF Coal Tar.

Write to TRENTON GAS AND ELECTRIC CO.,
1253-4 Trenton, N. J.

SECOND-HAND APPARATUS.

I am in position to offer at attractive prices, a considerable quantity of good, usable second-hand Gas Apparatus, of various kinds and sizes, such as Purifiers, Station Meters, Exhausters, Scrubbers and Condensers, Bench Ironwork, Water Gas Machinery, Tanks, etc., etc. Gas Companies or Contractors who can use such will find it worth while to write for prices, stating their requirements. Gas Companies having apparatus to dispose of are invited to communicate upon the matter. F. H. SHELTON,

315 Fidelity Building, 112 N. Broad St., Phila.

HENRY MARQUAND & CO.,

BANKERS AND BROKERS.

160 Broadway, New York City.

Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

Ammonia Concentrator.

Not Expensive. Write to

STROH & OSIUS, Pat'ees, or
Mich. Ammonia Works, Detroit, Mich.

A GOOD THING TO HARP ON.

All Gas Companies ought to use my illustrated advertising service.

Nearly a hundred and fifty of them do so now.

John M. Andrews, the able and efficient Superintendent of the Galion Gas Light Company, of Galion, Ohio, says in the course of a recent letter:

"We can lay to you the credit of much increase in business, as your cuts and ads. in our local papers seem to reach a class of people that personal interviews do not get. Your stuff gets them in our office, and the rest is easy."

I have probably a hundred letters equally cordial in tone; therefore I say: All Gas Companies ought to use my advertising service.

It brings in money.

Write me about anything in connection with your advertising.

Advertising for Gas Companies.

J. HOWLAND HARDING,
1545 Broadway,
(Long Acre Square) **NEW YORK CITY.**

KENTUCKY CANNEL COAL, FOR GAS AND DOMESTIC USE.

Geo. R. Hislop, F.C.S., F.R.S.S.A., Gas Engineer of Paisley, Scotland, says in his analysis: "This is a remarkably rich Cannel Coal, yielding illuminating matter per ton equivalent to 1,945 lbs. of sperm candles." This coal mined and shipped in box cars. Write for sample car and delivered price.

The Greasy Creek Cannel Coal and Tramway Co.,
163 W. Washington Street, - - - Chicago, Ills.

Emken Chemical Co.,

175 South Street, New York City. Works, Long Island City, N. Y.

MINERS OF MONAZITE AND MANUFACTURERS OF

THORIUM AND CERIUM NITRATE.

ALSO MANUFACTURERS OF

INCANDESCENCE FLUID

For Making Non-Shrinking Mantles of Highest Luminosity.

Bray's Patent Gas Burners

Are universally used and recommended by leading Gas Companies of the world.

Every Burner stamped with name and Trade Mark. Take no imitations.

Made for high and low pressure. Send for description and prices, also for

ACETYLENE BURNERS.

We are Sole Agents for the United States.

WILLIAM M. CRANE COMPANY,
Nos. 1181 and 1188 Broadway, New York City.

With Bray Burner

GILBERT & BARKER MFG. CO., 82 John Street, New York.

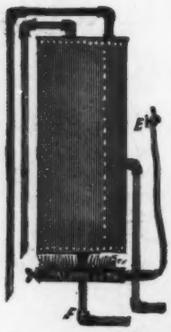
Gas Engineers and Contractors.

Gas Works constructed for Villages up to 1,000 Burners, using either Gasolene or Acetylene.

FUEL GAS FOR ALL MANUFACTURING PURPOSES, FOR COOKING AND LAUNDRY WORK, AND FOR DRIVING GAS ENGINES AND CALORIC PUMPING ENGINES.

We refer to the following Incorporated Gas Companies, using our plants: Merchants Gas Co., Norwich, N. Y; Merchants Gas Co., So. Otselic, N. Y.; So. New Berlin Gas Co., So. New Berlin, N. Y.; Afton Gas Co., Afton, N. Y.; DeRuyter Gas Co., DeRuyter, N. Y.; Bainbridge Gas Co., Bainbridge, N. Y.; Commercial Gas Light Co., Oxford, N. Y.; West Winfield Gas Co., West Winfield, N. Y.

An Economical Hot Water Heater.



PERFECT COMBUSTION. NO SMOKE. NO ODOR.

FULLY GUARANTEED.

Will heat the Water in a Boiler in less than half the time required by a Range, and at less than half the expense. Nothing to get out of order, and will last a lifetime.

Buffalo City Gas Co., Buffalo, N.Y., April 1, 1899.
J. P. B. Sadtler & Co., 813 S. Howard St., Baltimore, Md.
Gentlemen—Replying to your favor of the 30th of March. The Heller Heaters that you have already furnished seem to be large enough, and we will not at present care to use any of the larger size that you mention. We have had no complaint in regard to the Heller Heater that we have used in Buffalo, and so far they are giving us good satisfaction.
Yours very truly, E. H. Jenkins, Engineer.

Baltimore, Md., March 24, 1899.
J. P. B. Sadtler & Co., 813 S. Howard St., Baltimore, Md.
Gentlemen—A test of the Heller Water Heater witnessed by me March 21, 1899, showed that with a consumption of 30 feet of gas per hour, the water in a 28-gallon galvanized boiler could be heated from 59° to 102°, or 43° in one hour. Temperature of room at time of test 64°.
Respecfully,
Geo. Beadenkopp, Ass't Engineer, Con. Gas Co

Clamp Heater to Pipe about 4 Inches away from bottom of Boiler. Always use an independent connection, or regular Gas Stove connection, so as to get a good flow of Gas.

J. P. B. SADTLER & CO., 813 South Howard Street, Baltimore, Md.

Sutherland Construction & Improvement Co.

Offices: 15 WALL ST., NEW YORK, and OSHKOSH, WISCONSIN.

Owners of the "SUTHERLAND" Patents for Water Gas Apparatus.

Gas, Electric Light, Water Works, and Electric Street Railways Built, Remodeled, Operated, Bought and Sold.

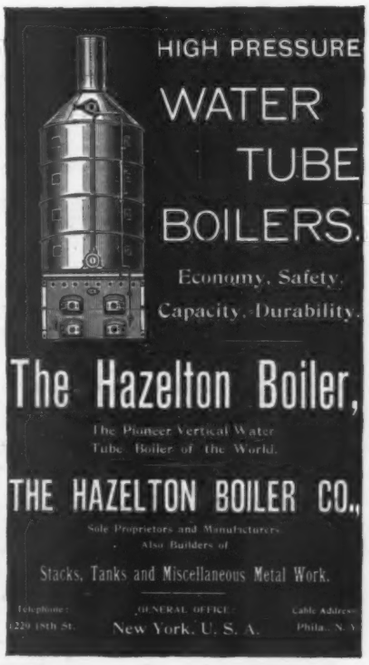
CORRESPONDENCE SOLICITED.

"THE MINER"
Globe
Street and Boulevard
Lamps.
Cheapest and Best.
THOUSANDS IN USE WITH INCANDESCENT BURNERS.
Send for Catalogues.
THOMAS T. W. MINER,
821-823 Eagle Av., N. Y.

SAFETY GAS MAIN STOPPER CO.
211-E. 116 TH ST. N.Y.

FOR SHUTTING OFF GAS IN MAINS TEMPORARILY DURING ALTERATIONS AND REPAIRS

GEORGE R. ROWLAND.
Formerly with the Continental Iron Works.
Draughtsman and Constructing Engineer.
Drawings, Specifications and Estimates furnished for the construction of new works or alteration of old works. Special attention given to Patent Office drawings.
Office, No. 245 Broadway, N. Y. City.


HIGH PRESSURE
WATER TUBE BOILERS.
Economy. Safety. Capacity. Durability.
The Hazelton Boiler,
The Pioneer Vertical Water Tube Boiler of the World.
THE HAZELTON BOILER CO.,
Sole Proprietors and Manufacturers
Also Builders of
Stacks, Tanks and Miscellaneous Metal Work.
Telephone: 1220 18th St.
GENERAL OFFICE:
New York, U. S. A.
Cable Address: Phila., N. Y.

For Sale.
A Small Gas and Electric Light Plant,
in a Southern city of 3,800 inhabitants.
Address FORT WAYNE ELECTRIC CORPORATION,
1097-tf Fort Wayne, Ind.

ARE YOU USING
Steward Burners?
If Not, WHY NOT?
The D. M. Steward Mfg. Co.,
N. Y. Office, 107 Chambers St. CHATTANOOGA TENN.

THE ANDERSON Patent Cutter Carrying Link
Made in all sizes.

Will cut from 2 in. to 24 in.
Pipe Cutting Tool

For Cutting Cast, Wrought Iron, Gas & Water Pipes.
THE ANDERSON PIPE CUTTER COMPANY, Manufacturers,
163 Liverpool st., E. Boston, Mass
N. Y. Office, 135 Greenwich St.
C. H. TUCKER, JR., Manager.
WALDO BROS.,
102 Milk Street, Boston, Mass.

GAS APPLIANCES FOR EVERY PURPOSE.

GAS RANGES,
GAS SOLDERING STOVES,
GAS STEAM TABLES,
GAS CREMATORIES,
BRAY BURNERS,
GAS BURNERS,
GAS SIGNS,
SELF-LIGHTING BURNERS,
BY-PASSES,
GAS FITTINGS,
METER COCKS,
SERVICE COCKS,
WAX TAPERS,
GOOSE NECKS,
SOCKETS,
TUBING, ETC.,
GRAY IRON CASTINGS.

GAS WATER HEATERS,
GAS KILNS,
GAS LAUNDRY STOVES,
GAS OVENS,
GAS PLATE WARMERS,
GAS OYSTER STEWERS,
GAS CONTROLLERS,
GAS BROILERS,
GAS HEATING STOVES,
GAS FIRES,
GAS RADIATORS,
GAS LOGS,
GAS CANDY STOVES,
GAS GRIDDLES,
GAS FURNACES,
GAS IRONS,
GAS TIPS,

THE NEW VULCAN GAS RANGE.

Sizes, 16 and 18-inch Ovens.

WILLIAM M. CRANE COMPANY,

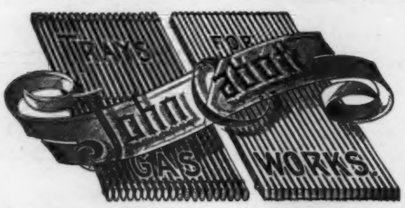
FOUNDRY: Peekskill, N.Y. Office and Showrooms: 1131 and 1133 Broadway. FACTORY: 447-453 W. 14th St.

Send for 1899 Catalogue. Sole Agents for BRAY BURNERS for U. S. A.

Special Trays for Iron Sponge or Oxide of Iron,

CHURCH'S TRAYS a Specialty.

Reversible, Strongest, Most Durable, Most Easily Repaired.



553-557 West Thirty-third Street, New York.

We also make the Cheapest and Strongest REVERSIBLE BOLTED TRAYS IN THE MARKET.

Send for Circulars.

ALEX. C. HUMPHREYS, M. E., M. Inst. C. E. ARTHUR G. GLASGOW, M. E., M. Inst. C. E.

HUMPHREYS & GLASGOW,

BANK OF COMMERCE BLDG., 31 Nassau Street, New York.

9 VICTORIA STREET, London, S. W., England.

CONSULTING GAS ENGINEERS AND MANAGERS.
GAS PROPERTIES PURCHASED.

Bristol's Recording
PRESSURE GAUGE.

For continuous records of **Street Gas Pressure.** Simple in construction, accurate in operation, and low in price.

Fully Guaranteed. Send for Circulars.

THE BRISTOL CO.,
Waterbury, Conn.

CHAPMAN VALVE MANUFACTURING CO.

MANUFACTURERS OF

Valves and Gates for Gas, Ammonia, Water, Etc.

Also, Gate Fire Hydrants with and without Independent Nozzle Valve. All Work Guaranteed.

Works & Gen'l Office, Indian Orchard, Mass. Treasurer's Office, 72 Kilby & 112 Milk Sts., Boston, Mass.
Chicago Office, 24 West Lake St. New York Office, 28 Platt St.
St. Louis Office, L. M. Rumsey Mfg. Co., 810 North Second St.

GASHOLDER TANKS AND GAS WORKS MASONRY COMPLETE

Plans prepared and Estimates furnished at short notice.

J. P. WHITTIER,

70 Rush St., Near Division Ave., Brooklyn, N. Y.

THE

Ludlow Valve Mfg. Co.,

TROY, N. Y., U. S. A.

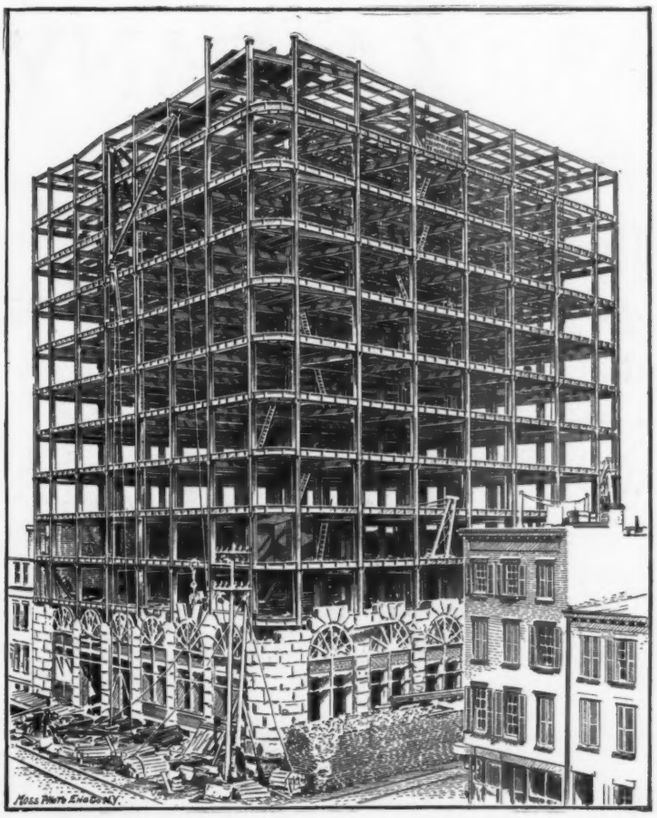
Double and Single Gate Valves, ¼" to 72",

—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.



CHARLES M. JARVIS, President. GEORGE H. SAGE, Secretary.
F. L. WILCOX, Treasurer.

THE BERLIN IRON BRIDGE COMPANY,

Engineers, Architects,

AND

Builders of Steel Structures.

The accompanying illustration is taken direct from a photograph made during construction, and shows a Steel Framework for the Fireproof Warehouse designed and built by us for James Everard, on the corner of Washington and Tenth Streets, New York, N. Y.

Main Office and Works,

EAST BERLIN, CONNECTICUT.

BOSTON OFFICE, 200 Equitable Building.
NEW YORK OFFICE, 718 Bennet Building, Cor. Fulton and Nassau Streets.

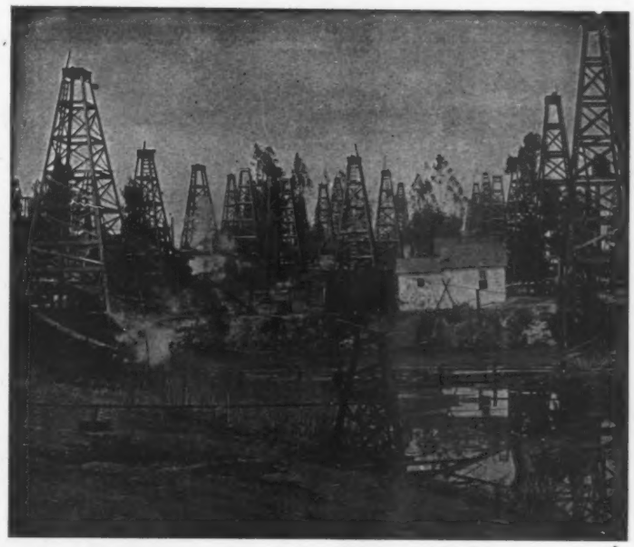
Gas Investments in California.

Nowhere else on this continent does such opportunity exist for profitable gas investment as on the Pacific Coast, since the perfection of the new LOWE Process for using the heavy crude California oils (of which there is an unlimited supply) without the use of any other fuels. Seven years' test proves the system to be perfect in every respect. Los Angeles alone, in addition to present street mains, has 150 miles of well built up streets without a gas main on them. To occupy this territory, and a large number of other towns now without gas, we have organized a parent company and a number of local companies covering some of the fastest growing cities in the United States.

Now is the time to invest, when the first capital will be able to double itself in a single year. This is also the most delightful residence section in the United States.

We suggest to those desiring gas investments, in large or moderate amounts—with or without active business connections—to come here and investigate; or, what is the next best thing, write us for particulars and prospectus.

The accompanying cut shows the oil wells in the suburbs of Los Angeles from which the Companies under the NEW LOWE GAS PROCESS obtain their supply of oil.



AMERICAN GAS & COKE CO. (T. S. C. Lowe, Manager),
406 Bradbury Building, Los Angeles, California.

THE GAS ENGINEER'S POCKET-BOOK.

By HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

Price, - - $3.50.

A. M. CALLENDER & COMPANY, No. 32 Pine Street, N. Y. City.

Coal Tar Genealogical Tree.

Mr. T. Viner Clarke, of London, Eng., having compiled a novel Chart or Map illustrating the various CHEMICAL PRODUCTS DERIVED FROM COAL AND COAL TAR, in the form of a Genealogical Tree, including all the products discovered (the total number amounting to near 700), offers for sale a limited number of copies in Colors, mounted on Linen, with Rollers. Price, $3.50. Orders may be sent to **A. M. CALLENDER & CO., 32 Pine Street. New York City.**

AMERICAN GAS COMPANY

Constructors of Coal Gas Apparatus.

KLONNE-BREDEL

Recuperative Furnaces, Washers, Condensers, Purifiers and Purifying Machines, Ammonia Plant, Coke Conveyers, Etc.

Complete Works Erected with Guaranteed Results.

EASTERN AGENTS FOR

FRED. BREDEL'S SYSTEM
COAL GAS PLANTS AND GAS APPARATUS.

P. H. & F. M. ROOTS CO.'S
Exhausters, Blowers, etc.

222 South Third Street, Philadelphia, Pa.

GEORGE G. RAMSDELL, General Manager. **Correspondence Solicited**

FRED. BREDEL, C.E.

Coal and Water Gas Plants.

OWN SYSTEM.

RECUPERATIVE FURNACES, WASHERS, CONDENSERS, PURIFIERS, PURIFYING MACHINES, COKE CONVEYERS, ETC

SOLE UNITED STATES AGENT FOR
ARROL-FOULIS MECHANICAL CHARGING AND DRAWING MACHINES.

Gas Enriching Plants to Enrich Coal Gas up to 24 Candle Power, and Making a White, Bright, Non-smoking Gas

GAS RETORTS AND SPECIAL BLOCKS AND FIREBRICK MANUFACTURED UNDER THE SUPERINTENDENCE OF MY OWN CHEMIST.

COMPLETE GAS WORKS

No. 118 Farwell Avenue, · Milwaukee, Wis.

Eastern Agents: AMERICAN GAS CO., Construction Department, 222 So. 3d St., Phila., Pa

ROOTS'

LATEST IMPROVED GAS EXHAUSTER

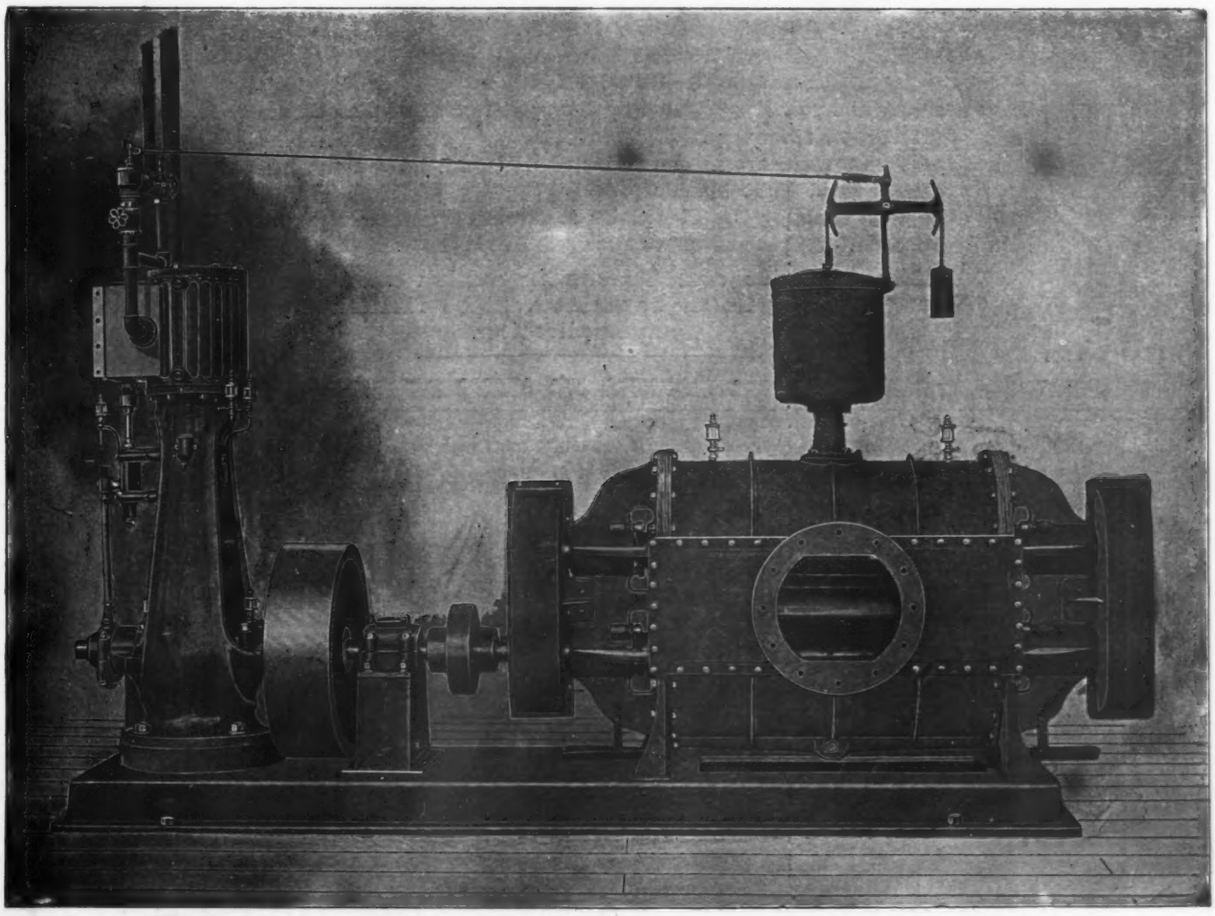
—AND—

NEW GAS GOVERNOR AND STEAM VALVE.

GUARANTEED TO REGULATE WITHIN ONE-TENTH OF AN INCH, WATER PRESSURE.

The Most Perfect Gas Governor on the Market.

MORE DIRECT IN ACTION. FEWER PARTS.
EASIER TO ADJUST THAN ANY OTHER GOVERNOR.



INQUIRIES CHEERFULLY ANSWERED. WRITE FOR CATALOGUE.

P. H. & F. M. ROOTS CO.,

Connersville, Ind. 109 Liberty St., New York.

Eastern Office:

American Gas Company,

222 South Third Street, Philadelphia, Pa.

New York, 33 Nassau St. Philadelphia, Broad and Arch Sts. Chicago, 54 Lake St.

WELSBACH STREET LIGHTING COMPANY OF AMERICA,

—OWNS, CONTROLS AND OPERATES—
EXCLUSIVELY

THE NEW IMPROVED AND PATENTED STREET LIGHT BURNER.

STYLE No. 81.

Our PATENTED "STREET LIGHT APPLIANCES" have made WELSBACH STREET LIGHTING a complete success.

By the UNIFORM DISTRIBUTION of light on scientific principles a greater area can be lighted by our system and more economically than in any other way.

Where there are no gas mains already laid, we can furnish an equally good light by our **SELF-GENERATING NAPHTHA WELSBACH BURNER,** enabling Gas Companies to furnish a uniform light in all localities.

Lists of Cities and Towns in which we are now lighting under contract will be furnished upon application.

STYLE No. 97.

CORRESPONDENCE SOLICITED FROM GAS COMPANIES AND OTHERS INTERESTED IN MUNICIPAL LIGHTING.

W. H. PEARSON, Prest. W. H. PEARSON, Jr., Vice-President. J. T. WESTCOTT, M.E., Manager. L. L. MERRIFIELD, M.Inst.M.E., Chief Engineer.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION CO., LD.

American Offices: 269 FRONT STREET, EAST, TORONTO, ONT.
London Offices: 19 ABINGDON STREET, WESTMINSTER, S.W.

Telegraphic Address: "CARBURETED LONDON AND TORONTO."

The above Company have erected since 1893, or are now erecting, their universal type of Carbureted Water Gas Plants at the following Gas Works:

	Cubic Feet Daily.
Blackburn, Eng.	1,250,000
Windsor Street Works, Birmingham, Eng.	2,000,000
Saltley Works, Birmingham, Eng.	2,000,000
Colchester, Eng.	300,000
Birkenhead, Eng.	2,250,000
Swindon (New Swindon Gas Co.), Eng.	120,000
Saltley Works, Birmingham, Eng. (2d Contract)	2,000,000
Windsor St. W'ks, Birming'm, Eng. (2d Contract)	2,000,000
Halifax, Eng.	1,000,000
Toronto,	250,000
Ottawa,	250,000
Toronto (Second Contract, Remodeled),	2,000,000
Lindsay (Remodeled),	125,000
Belleville,	250,000
Ottawa (Second Contract),	250,000
Brantford (Remodeled)	200,000
St. Catherine's (Remodeled),	250,000
Kingston, Pa.	125,000
Montreal,	500,000
Peterborough, Ont.	250,000
Wilkesbarre, Pa.	750,000
St. Catherine's (Second Contract),	250,000
Buffalo, N. Y.	2,000,000
Winnipeg, Man.	500,000
Colchester, Eng. (Second Contract),	300,000
York, Eng.	750,000
Rochester, Eng.	500,000
Kingston, Ont.	300,000
Crystal Palace District, Eng.	2,000,000
Duluth, Minn.	300,000
Caterham, Eng.	150,000
Enschede, Holland,	150,000
Leicester, Eng.	2,000,000

(Copyrighted, 1894, by the AMERICAN METER CO.

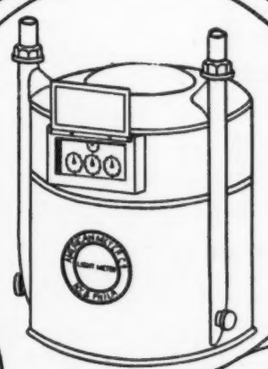
AMERICAN METER CO.

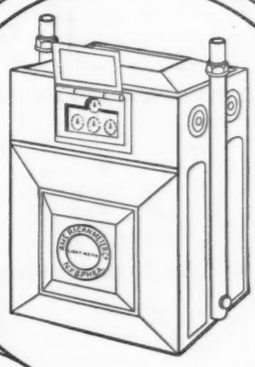
ESTABLISHED 1834. INCORPORATED 1863.

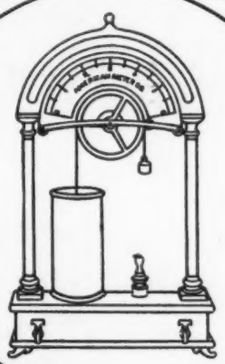
NEW YORK AND PHILADELPHIA,

CHICAGO, ST. LOUIS,

SAN FRANCISCO.



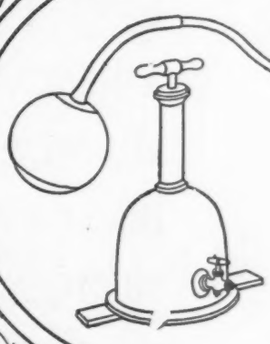


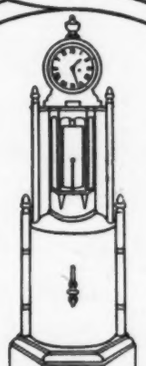


PUBLIC LIGHTING TABLE.

JULY, 1899.

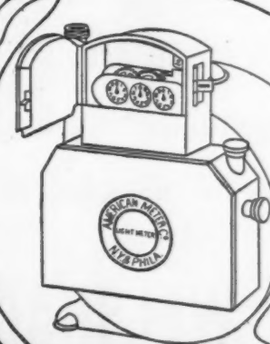
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. Extinguish.
				P.M.	A.M.
Sat.	1	8.00 PM	1.20 AM	7.30	3.15
Sun.	2	8.00	2.00	7.30	3.15
Mon.	3	8.00	2.40	7.30	3.15
Tue.	4	8.00	3.40	7.30	3.15
Wed.	5	8.00	3.40	7.30	3.15
Thu.	6	8.00	3.40	7.30	3.15
Fri.	7	8.00 NM	3.40	7.30	3.15
Sat.	8	8.00	3.40	7.30	3.15
Sun.	9	8.00	3.40	7.30	3.15
Mon.	10	8.00	3.40	7.30	3.15
Tue.	11	8.00	3.40	7.30	3.15
Wed.	12	8 40	3.40	7.30	3.15
Thu.	13	9.10	3.40	7.30	3.15
Fri.	14	9.30	3.40	7.30	3.15
Sat.	15	10.00 FQ	3.40	7.30	3.15
Sun.	16	10.40	3.50	7.20	3.15
Mon.	17	11.10	3.50	7.20	3.15
Tue.	18	12.00 AM	3.50	7.20	3.15
Wed.	19	1.00	3.50	7.20	3.15
Thu.	20	2.10	3.50	7.20	3.15
Fri.	21	No L.	No L.	7.20	3.15
Sat.	22	No L. FM	No L.	7.20	3.15
Sun.	23	No L.	No L.	7.20	3.15
Mon.	24	7.50 PM	9.20 PM	7.20	3.15
Tue.	25	7.50	9.50	7.20	3.15
Wed.	26	7.50	10.20	7.20	3.15
Thu.	27	7.50	10.50	7.20	3.15
Fri.	28	7.50 LQ	11.30	7.20	3.15
Sat.	29	7.50	12 00 AM	7.20	3.15
Sun.	30	7.40	12.40	7.10	3.30
Mon.	31	7.40	1.30	7.10	3.30

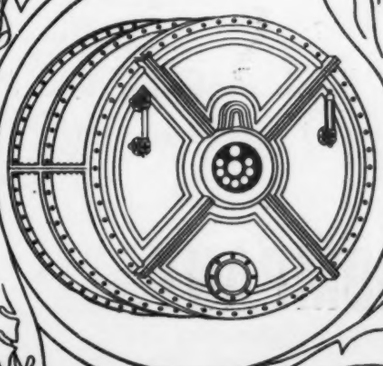




TOTAL HOURS LIGHTING DURING 1899.

By Table No. 1.	Hrs.Min.	By Table No. 2.	Hrs.Min.
January	215.40	January	423.20
February	184.40	February	355.25
March	187.40	March	355.35
April	166.50	April	298.50
May	158.00	May	264.50
June	140.50	June	234.25
July	150.30	July	243.45
August	168.30	August	280.25
September	179.50	September	321.15
October	213.20	October	374.30
November	217.00	November	401.40
December	238.10	December	433.45
Total, yr.	2221.00	Total, yr.	3987.45





Welsbach Patent Again Sustained.

Following the recent decision in the United States Circuit Court of Appeals, sustaining the Welsbach Company's Patent, Judge Lacombe, in the United States Circuit Court, has enjoined the following infringers of the Welsbach Patent:

DAYLIGHT INCANDESCENT GAS LAMP CO.
REX INCANDESCENT GAS LIGHT CO.
AMERICAN INCANDESCENT LIGHT CO.
NEW YORK CHEMICAL REFINING CO.
UNION INCANDESCENT LIGHT CO.
AMERICAN LIGHTING CO.
YOUNG & FLETCHER CO.
HECKLA MANTLE WORKS, Henry Anhalzer, Prop'r.
MERIDEN-ALBERTA MANTLE CO.

You are cautioned against infringement of the Welsbach Patent, as you will be held liable for an accounting.

All genuine Welsbach Lights bear the trademark "WELSBACH," and are for sale by all first-class dealers in Gas Appliances.

WELSBACH COMMERCIAL COMPANY,

Philadelphia.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

THE STANDARD JUNIOR,

THE STANDARD DOUBLE SUPERHEATER,

LOWE WATER GAS APPARATUS.

Under Contract, 1899:

	SETS.	DAILY CAPACITY.
Fostoria, O.	1	250,000 Cubic Feet.
Derby, Conn.	1	750,000 "
Lowell, Mass.	1	1,000,000 "
Doylestown, Pa.	1	50,000 "
Darby, Pa.	1	400,000 "
Adrian, Mich.	1	125,000 "
Concord, N. H.	1	400,000 "
Sioux City, Iowa	1	750,000 "
Standard Gas Light Co., New York	3	5,400,000 "
Peekskill, N. Y.	1	250,000 "
Westchester, N. Y.	1	250,000 "
Jersey City, N. J.	1	1,000,000 "
Stapleton, N. Y.	1	750,000 "
London, O.	1	125,000 "
Chicago, Ills.	2	3,600,000 "
Putnam, Conn.	1	125,000 "
Mansfield, O.	1	250,000 "
Plymouth, Pa.	1	125,000 "
Athens, Pa.	1	125,000 "
Total	22	15,725,000 "
Previously built	294	187,100,000 "
Grand Total	316	202,825,000 "

Established 1858. Incorporated 1890.
CHAS. E. GREGORY Prest. DAVID R. DALY V. Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES,
FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

E. D. WHITE, President. A. H. GUTKES, Vice-President. H. A. PERKINS, Secretary.

Brooklyn Fire Brick Works,

MANUFACTURERS OF

CLAY RETORTS, FIRE BRICK,
Gas House and other Tile.

Office, 88 Van Dyke St. Brooklyn, N. Y.

Established 1854. Incorporated 1869.

LACLEDE
Fire Brick Manufg. Co.,

Manufacturers of { GAS RETORTS . .
FIRE BRICK . . .
RETORT SETTINGS

Water Gas Cupola Linings, Fire Clay, Etc.

Exclusive Agents for

The Mitchell Half-Depth Regenerative Furnace.

This is the *original* coal-consuming Furnace for Retort Benches. Burns either Coal or Coke. Full and Half-Depth Regenerative Furnaces for Benches of 6's, 7's, 8's or 9's erected complete.

Proprietors of the Coze System of Inclined Retorts.

Office: 901 Pine St., **St. Louis, Mo.**

ESTABLISHED IN 1845.

B. KREISCHER & SONS,

Office, 119 E. 23d St., New York.

Gas Retorts,

TILES, FIRE BRICK.

AND EVERYTHING IN THE FIRE CLAY LINE.

Adam Weber,

Proprietor,

Manhattan Fire Brick and Enameled Clay Retort Works.

Works, Weber, N. J.

Office, 633 East 15th St., New York.

Modern Recuperative Furnaces

And Standard Fire Brick and Gas Retorts.

Works, LOCKPORT STATION, PA.

—ESTABLISHED 1864.—

JAMES GARDNER, JR.,

Successor to WILLIAM GARDNER & SON

Hamilton Building, Fifth Avenue PITTSBURGH, PA. P. O. Box 373

Fire Clay Goods for Gas Works.

SOLE REPRESENTATIVE OF THE McILHENNY REGENERATIVE BENCHES FOR THE U. S.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,

BENCH SETTINGS,

Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

PRICE LIST.

In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD & CO.,

N. 3d & Prospect Avs., Mt. Vernon, N.Y.

Western Agent, H. T. GEROULD, Centralia, Ills.

Parker-Russell Mining and Mfg. Co.,

CITY OFFICE,
417 Pine Street, St. Louis, Mo.

PROPRIETORS OF THE

OAKHILL GAS RETORT & FIRE BRICK W'KS

Our immense establishment is now employed almost entirely in the manufacture of

Materials for Gas Companies

We have studied and perfected three important points. Our retorts are made to stand changes of temperature, the strongest heats of the furnace, and the abrasion of feeding and emptying. We construct

Half and Full Depth Benches of Our Own Design,

Containing 6, 8 or 9 Retorts.

We have Greatly Improved our Recuperators. Coal or Coke can be used as Fuel in Furnaces.

THEO. J. SMITH, Prest. J. A. TAYLOR, Sec'y
A. LAMBLA, Vice-Prest. and Supt.

BALTIMORE RETORT & FIRE BRICK CO.

MANUFACTORY AT

LOCUST POINT BALTIMORE MD.

Clay Retorts, Blocks & Tiles

FIRE BRICK, FIRE CLAY,
AND FIRE CEMENT.

Red and Buff Ornamental Tiles and Chimney Tops. Baker Oven Tiles 12x12x2 and 16x16x2.

WALDO BROS., 102 MILK ST., BOSTON, MASS.

Sole Agents for New England States.

PRACTICAL PHOTOMETRY.

A Guide to the Study of the Measurement of Light.

By WILLIAM JOSEPH DIBDIN.

With Numerous Illustrations. Price, $3.00 A. M. CALLENDER & CO., 32 Pine Street, N. Y. City

National Gas and Water Company.

CONTRACTORS FOR
Gas Plant Machinery

SOFT COAL OR COKE
WATER GAS GENERATORS
A SPECIALTY.

218 LA SALLE ST.,
CHICAGO.

Gas Engineers
INSPECTION AND ADVICE.

PLANS AND ESTIMATES
FOR IMPROVEMENTS OR
REPAIRS.

CONNELLY IRON SPONGE AND GOVERNOR CO.,

(Successors to CONNELLY & CO.)
MANUFACTURERS OF GAS WORKS SPECIALTIES.

"IRON SPONGE." Saves money, saves labor, and is the most efficient purifying material ever offered as a substitute for lime. We guarantee a large saving, both in cost of material and labor.

AUTOMATIC GOVERNOR.
OVER FOUR HUNDRED NOW IN USE! NO WORKS COMPLETE WITHOUT IT!
WILL PAY FOR ITSELF WITHIN A YEAR! ITS SERVICE SECURES PERFECT DISTRIBUTION!
REDUCES LEAKAGE TO MINIMUM, and BENEFITS THE COMPANY and CONSUMER ALIKE!
IT IS THE ONLY RECOGNIZED AUTOMATIC GOVERNOR IN THE WORLD!

STEAM JET EXHAUSTER. Designed particularly for small works. Combines Exhaust Tube, Steam Governor, Gas Compensator and Bye-Pass Valves in the most compact form possible. Occupies but little space; uses very little steam; saves formation of carbon in retorts; increases yield 10 to 15 per cent. No works too small to use them profitably.

Prices given on all our specialties, delivered at any point in the United States. Correspondence solicited.

CONNELLY IRON SPONGE AND GOVERNOR CO., No. 357 Canal St., New York.

Hughes' "Gas Works,"

Their Construction and Arrangement,

And the Manufacture and Distribution of Coal Gas.

Originally written by SAM'L HUGHES, C.E.

Rewritten and Much Enlarged by
WM. RICHARDS, C.E

Eighth Edition, Revised, with Notices of Recent Improvements.

Price, $1.65.

A. M. CALLENDER & CO.,
32 Pine St., N. Y. City.

IRON MASS
For Gas Purification.
Acts immediately, and more efficiently than any other purifying agent now in use.
GREENPOINT CHEMICAL WORKS,
Greenpoint Ave. and Newtown Creek, Brooklyn, N. Y.

The Chemistry of Illuminating Gas.
By NORTON H. HUMPH Price, $2.40.
A. M. CALLENDER & CO., 32 PINE ST., N. Y. CITY

Cyanogen.
A PURIFYING MATERIAL FOR GAS.
Soft and porous, it can be used in the natural state without any preparation, and it ensures perfect purification.
SPECIMENS AND PRICES ON APPLICATION.

VAN BAARDA & CO.,
MINE OWNERS,
DUSSELDORF-ON-THE-RHINE.

Parson's Steam Blower,
FOR IMPROVING BAD DRAUGHT IN BOILERS, AND FOR BURNING BREZEE OR OTHER WASTE MATERIAL.

PARSON'S TAR BURNER,
FOR USING COAL TAR AS FUEL.

PARSON'S AIR JET TUBE CLEANER,
FOR CLEANING BOILER TUBES.

These devices are all first-class. They will be sent to any responsible party *for trial*. No sale unless satisfactory. Manufactured by the WATERTOWN STEAM BLOWER COMPANY.

H. E. PARSON, Supt., 67 Bremen Street, Brooklyn, N. Y.

JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

TIDEWATER SALES AGENTS FOR THE FOLLOWING:

Ocean Mine Youghiogheny Gas Coal,
Old Kentucky Shale and O. K. Boghead.

SHIPMENTS FROM NEW YORK, PHILADELPHIA, BALTIMORE AND NORFOLK.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:

Washington Building, New York.
Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully prepared.
For Gas Making or
Heavy Steaming.

SCIENTIFIC BOOKS.

NEWBIGGING'S HANDBOOK. By Thos. Newbigging. 6th edition. $6.

COX'S GAS FLOW COMPUTER. $2.50.

HUGHES' GAS WORKS. $1.65.

POOLE ON FUELS. By Herman Poole. $3.

GAS ENGINEER'S POCKET-BOOK. By Henry O'Connor. $3.50.

TECHNICAL GAS ANALYSIS. $3.

GAS CONSUMER'S HANDYBOOK, by Wm. Richards. 20 cents.

CHEMISTRY OF ILLUMINATING GAS. By Norton H. Humphrys. $2.40.

PRACTICAL TREATISE ON HEAT By Thomas Box. 2d edition. $5.

PRACTICAL PHOTOMETRY: A Guide to the Study of the Measurement of Light. By W. J. Dibdin. $3.

CHEMICAL TECHNOLOGY: Vol. I., *Fuel and Its Applications*, $5. Vol. II., *Lighting*, $4.

IRONWORK: Practical Designing of Structural Ironwork. By H. Adams. $3.50.

GAS WORKS: Their Arrangement, Construction, Plant and Machinery. $5.

PRACTICAL HANDBOOK ON GAS ENGINES, by G. Lieckfield. $1.

LIQUID FUEL FOR MECHANICAL AND INDUSTRIAL PURPOSES. By E. A. Brayley Hodgetts. $2.50.

COAL: Its History and Use. By Prof. Thorpe. $3.50.

HEAT A MODE OF MOTION. By John Tyndall. $2.50.

THEORY OF HEAT. By J. Clerk-Maxwell. $1.50.

MANUAL FOR GAS ENGINEERING STUDENTS. By D. Lee. 40 cents.

GASFITTER'S GUIDE, by John Eldridge 40 cents.

AMMONIA AND AMMONIUM COMPOUNDS. By Dr. R. Arnold. $2

CONSTRUCTION OF GAS WORKS, by Walter Ralph Herring. $2.

DIGEST OF GAS CASES. $5.

PRACTICAL HINTS ON REGENERATOR FURNACES By M. Graham. $1.25.

DISTILLATION OF COAL TAR AND AMMONIACAL LIQUOR. By Geo. Lunge. New edition. $12.50.

A TREATISE ON THE COMPARATIVE COMMERCIAL VALUES OF GAS COALS AND CANNELS. By D. A. Graham. $3.

A TEXT BOOK OF INORGANIC CHEMISTRY. By Prof. Victor Von Richter. $2.

ILLUMINATING AND HEATING GAS. By W. Burns. $1.50

HANDBOOK FOR MECHANICAL ENGINEERS. By H. Adams. $2.50.

TREATISE ON MASONRY CONSTRUCTION. Baker. $5

GAS ENGINEER'S LABORATORY HANDBOOK. By Jno. Hornby. $2.50.

GAS LIGHTING AND GAS FITTING. By W. P. Gerhard. 50 cents.

PRACTICAL PLUMBING. By P. J. Davies. $3.

AMERICAN PLUMBING. By Alfred Revill. $2.

CEMENT; A Manual of Lime and Cement, their Treatment and Use in Construction. By A. H. Heath. $2.50.

A COMPARISON BETWEEN THE ENGLISH AND FRENCH METHODS OF ASCERTAINING THE ILLUMINATING POWER OF COAL GAS. $1.60.

ELECTRICITY.

INDUSTRIAL PHOTOMETRY, with Special Application to Electric Lighting. By A. Palaz, Sc.D. $4.

ELEMENTS OF ELECTRIC LIGHTING, Including Electric Generation, Measurement, Storage and Distribution. By Philip Atkinson. $1.50.

ELECTRIC TRANSMISSION OF ENERGY. By G. Kapp. $3.50.

ELECTRICIAN'S POCKETBOOK. By Monroe and Jamieson. $2.50.

MAGNETISM AND ELECTRICITY. By J. Overend. 40 cts

DYNAMO BUILDING. By F. W. Walker. 50 cents.

DOMESTIC ELECTRICITY FOR AMATEURS. By E. Hospitalier. $2.50.

PRACTICAL MANAGEMENT OF DYNAMOS AND MOTORS. $1.

PRACTICAL GUIDE TO THE TESTING OF INSULATED WIRES AND CABLES. $1.

ELECTRIC LIGHTING, by Francis B. Crocker. $3.

ELECTRIC LIGHT FITTING. $2.

PRACTICAL ELECTRICITY. $2.50.

ELECTRICITY FOR ENGINEERS. $2.50.

ELECTRICITY, Its Theory, Sources and Applications. By John T. Sprague. $6.

The above will be forwarded upon receipt of price. If sent by mail or express, postage or express charges must be added to above prices. We take especial pains in securing and forwarding any other Works that may be desired, upon receipt of order. All remittances should be made by check, draft, or post office money order. No books sent C.O.D.

A. M. CALLENDER & CO., 32 Pine Street, New York.

The Despard Gas Coal Co.,

MINERS AND SHIPPERS OF

DESPARD GAS COAL,

AND MANUFACTURERS OF

COKE.

MINES, - - Clarksburgh, Harrison Co., West Va.
WHARVES, - - - Locust Point Baltimore, Md.
OFFICE, - 640 Equitable Building Baltimore, Md.

ROUSSEL & HICKS, 71 Broadway, N. Y. } *AGENTS,* { BANGS & HORTON 60 Congress St., Boston.

KELLER ADJUSTABLE COKE CRUSHER.

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,
Sec. & Supt. Gas Lt. & Coke Co.,
Columbus, Ind.
Correspondence Solicited.

Do You Wish to Know

what size of pipe to use to convey any quantity of gas, any distance, with any loss of pressure and any initial or final pressure? Then use

Cox's Gas Flow Computer,

as it gives this information accurately at sight, without mental effort. No calculations needed. Saves time, money and mistakes.

Price, 6.5 x 8 inches, in cloth case, $2.50. For sale by

A. M. Callender & Co., 32 Pine St., N. Y.

GREENOUGH'S "DIGEST OF GAS CASES."

Price, $5.00.

This is a valuable and important work, a copy of which should be in the possession of every gas company in the country, whether large or small. As a book of reference it will be found invaluable. It is the only work of the kind which has ever been published in this country, and is most complete. Handsomely bound. Orders may be sent to

A. M. CALLENDER & CO., 32 Pine St., N. Y.

— THE —

PENN GAS COAL CO.

OFFER THEIR

Coal, Carefully Screened and Prepared for Gas Purposes.

Their property is located in the Youghiogheny Coal Basin, near Irwin and Penn Stations on the Pennsylvania Railroad, and on the Youghiogheny River.

Principal Office:

Room 720, Reading Terminal Building, Phila., Pa.

Points of Shipment:

Pennsylvania Railroad Piers; Greenwich Wharves, Delaware River; Pier No. 1 (Lower Side), South Amboy, N. J.

EDMUND H. McCULLOUGH, Prest. CHAS. F. GODSHALL, Treas. H. C. ADAMS, Sec.

THE WESTMORELAND COAL CO.

Chartered 1854.

Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

POINTS OF SHIPMENT:

PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J.,
WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

Principal Office, 224 South 3d St., Phila., Pa.

THE SUN OIL CO.

Crude Oil, Gas Naphtha,
Refined Petroleum, Gas Oil.

Toledo, O., and Pittsburgh, Pa.

Standard Oil Company,

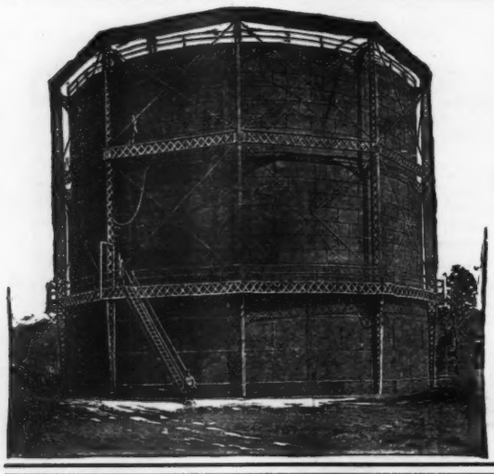
GAS NAPTHA DEPARTMENT.

GAS NAPTHA.

GAS OIL.

Correspondence Solicited.

26 Broadway, New York City.



DAVIS & FARNUM MFG. CO.,
WALTHAM, MASS.

Principal Office & Works, Waltham, Mass. Boston Office, R'm 18, Vulcan Bldg., 8 Oliver St.

Single, Double and Triple-Lift Gasholders of any Capacity. Tubular, Pipe and Sinuous Friction Condensers of all Sizes.

Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

Coke Borrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

Also, Gas and Water Pipe, Flanged Pipe, Sugar House Work, and Special Castings of all Descriptions.

BAXTER & YOUNG,
CONTRACTING AND CONSULTING GAS ENGINEERS.

Examination and Values Ascertained of Artificial and Natural Gas Properties.

COMPLETE GAS WORKS ERECTED.

Artificial and Natural Gas Mains Furnished and Laid.

CORRESPONDENCE SOLICITED.

OFFICE: WAYNE COUNTY BANK BUILDING,
Rooms 201 & 202. DETROIT, MICH.

A. E. BOARDMAN, C. E.,
Consulting and Contracting Engineer.

Particular attention given to Gas, Water and Electric Plants. Long and successful experience with the problem and practice of

Filtration for Public Water Supply.

BREVARD, N. C.

Geo. Shepard Page's Sons.
GAS MACHINERY.

Correspondence Solicited.

69 Wall Street, New York City.

JAMES T. LYNN,
GAS ENGINEER
AND
CONTRACTOR,

Wayne Bank Building, - DETROIT.

GAS PROPERTIES PURCHASED.

DAVID LEAVITT HOUGH,
Consulting Engineer
AND
CONTRACTOR,

374 FIFTH AVE., N. Y.

Kerr Murray Manufacturing Company,
Steel Gasholder Tanks,
SINGLE, DOUBLE AND TRIPLE-LIFT GASHOLDERS,
HORIZONTAL AND VERTICAL STORAGE OIL TANKS

Iron Work for Coal Gas Benches, Self-Sealing Mouthpieces, Exhausters, Condensers, Scrubbers, Purifiers, Wooden Trays, Floor Carriages, Center Seal and Valve System Connections, Cast and Wrought Iron Fittings, and Connections 3 to 36 Inches Diameter.

VALVES, Double Gate, Hub and Flange, Outside Screw and Quick Opening, 3 to 36 In. Diam.

COAL AND COKE WAGONS, RETORT HOUSE TOOLS, STREET MAIN SPECIALS AND DRIPS.

Address.

KERR MURRAY MANUFACTURING CO.
Fort Wayne, Indiana.

BARTLETT, HAYWARD & CO.

BALTIMORE, MD.

Triple, Double and Single-Lift Gasholders.

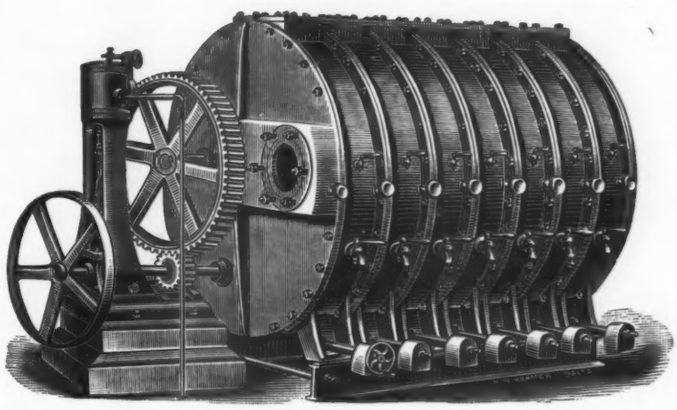
Iron Holder Tanks.

ROOF FRAMES.

Girders.

BEAMS

PURIFIERS.



CONDENSERS.

Scrubbers.

Bench Castings.

OIL STORAGE TANKS

Boilers.

PATENT STANDARD WASHER-SCRUBBER.

The best apparatus for the extraction of all Ammonia and a large proportion of Carbonic Acid and Sulphureted Hydrogen. The Scrubber has been materially improved and is provided with patented Wooden Segmental Grids, instead of Metallic Discs, thus reducing the weight on shaft and power for operating same.

The Wilkinson Water Gas Process.

THIRTY-CANDLE, NON-CONDENSIBLE, FIXED GAS. THE MOST SUCCESSFUL GAS PROCESS IN OPERATION.

MILL'S REVERSIBLE LIME TRAYS.

Gas Works Designed and Constructed.

EXCERPTS FROM DECISIONS

—OF THE—

BOARD OF GAS COMMISSIONERS of the COMMONWEALTH OF MASSACHUSETTS.

MR. E. H. YORKE, NEW HAVEN, CONN., Dec. 1, 1898.

Dear Sir:—I am in receipt of a copy of "Excerpts from the Decisions of the Board of Gas Commissioners," which is a handy compilation in book form of extracts from the most recent decisions of the Gas Commission of Massachusetts.

I note that most of these extracts are broad and safe-guiding precepts, which apply with equal force to one Company as to another. The 13 years' existence of the Board of Gas Commissioners with its unusual opportunities for acquiring information, have justly made it a high and safe authority in all matters pertaining to the management, obligations, and rights of Gas Companies. Your little book will serve as a valuable reference library in settling legal complications which often arise between a Gas Company and its customers.

Yours truly, (Signed) F. C. SHERMAN, Superintendent.

A 28-page Pamphlet containing the cream of this Board's decisions as to the proper management of Gas Companies.

Compiled by E. H. YORKE. Price $1.00. Address

A. M. CALLENDER & CO., - No. 32 Pine Street, N. Y. City.

Foundries and Works: {Millville, N. J. Florence, " Camden, "

R. D. WOOD & CO.

ENGINEERS, IRON FOUNDERS, MACHINISTS

400 Chestnut Street, PHILADELPHIA, PA.

MANUFACTURERS OF

Cast Iron Pipe.

SOLE MAKERS OF

THE MITCHELL SCRUBBER
(PATENTED)

PURIFIERS, CONDENSERS,
SCRUBBERS, BENCH WORK.

BUILDERS OF

Gas Holders.

Single, Double and Triple Lifts, with or without Wrought Iron or Steel Tanks.

PEASE'S PATENT WIRE ROPE GUIDING FOR GAS HOLDERS.

CUTLER'S PATENT FREEZING PREVENTER
For Gas Holder Cups.

THE TAYLOR
REVOLVING BOTTOM GAS PRODUCER.

HEAVY LOAM CASTINGS, DUNHAM SPECIALS,
HYDRAULIC WORK, LAMP POSTS, VALVES, Etc.

ISBELL-PORTER CO.,

ENGINEERS AND CONTRACTORS FOR THE

Construction and Extension of Gas Works.

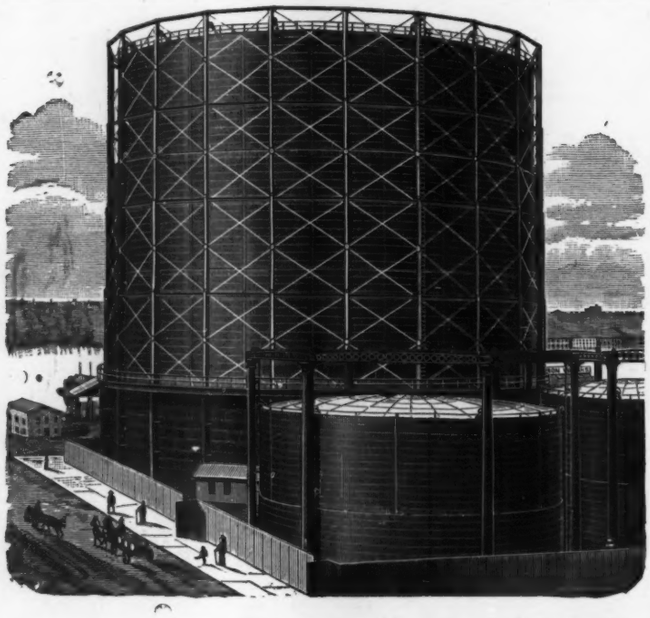
FOUNDERS AND MACHINISTS.

MANUFACTURERS OF

All Ironwork and Machinery Required in a Gas Plant.

Estimates, Drawings and Specifications furnished for the Alteration, Improvement, or Extension of Existing Works or the Construction of New Works.

245 Broadway, New York City. —OFFICES— Bridge & Ogden Sts., Newark, N. J.



The Continental Iron Works,

THOMAS F. ROWLAND, President.
WARREN R. HILL and CHAS. H. CORBETT, Vice-Presidents.
THOMAS F. ROWLAND, Jr., Secretary & Treasurer.

West and Calyer Sts. (Near 10th & 23d St. Ferries)
NEW YORK, Borough of Brooklyn.

BUILDERS OF

Gas Holders.

Single and Multiple Section Gas Holders a Specialty.

STEEL GAS HOLDER TANKS.

BENCH CASTINGS, RETORT LIDS.

Hydraulic Mains, Condensers, Scrubbers,
Purifiers, Valves, Etc.

Self-Sealing Retort Mouthpieces & Lids

For Round, Oval, or "D" Retorts.

ILLUMINATING GAS! FUEL GAS!

THE LOOMIS PROCESS.

Now in successful operation at Works of John Russell Cuttlery Co., Turner's Falls, Mass., and Henry Disston's Son's Saw Works, Tacony, Pa.

The Cheapest Gas Generating System in the World.

Plans and Estimates Furnished.

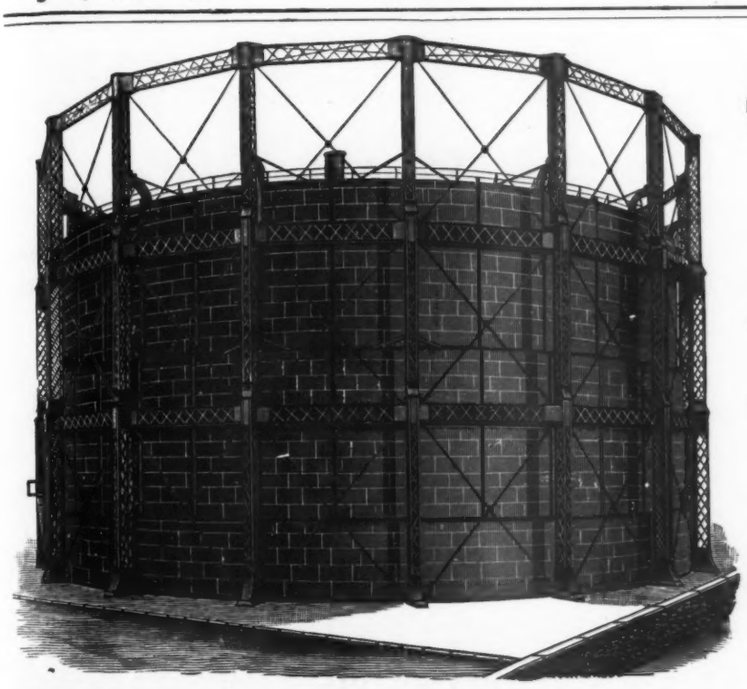
BURDETT LOOMIS, - - Hartford, Conn.

To Gas Companies.

We make to order CAP BURNERS to burn any amount under a stated pressure. Send for samples.

Also SERVICE CLEANERS, DRIP PUMPS, and STREET MAIN PROVING APPARATUS.

C. A. GEFRORER,
248 N. 8th St., Phila., Pa.



H. RANSHAW, Prest. & Mangr. T. H. BIRCH, Asst. Mangr
WILLIAM STACEY, Vice-Prest. R. J. TARVIN, Sec. & Treas.

THE STACEY MANUFACTURING CO
Established 1851.

Single, Double and Triple-Lift

GASHOLDERS,

Of any Capacity, with or without Wrought Iron or Steel Tanks.

Hydraulic Mains, Condensers, Scrubbers, Purifiers, Valves, etc.

Coal Gas Benches, Roof Frames,

OIL STORAGE TANKS.

Pressed Steel Mouthpiece Lids, Self-Sealing Mouthpiece Lids.

Cincinnati, Ohio.

RITER-CONLEY MFG. CO.,

GASHOLDERS, with or without Steel Tanks.

Purifiers, Condensers, Scrubbers, Oil Tanks, Smoke Stacks.

STEEL ROOFS and BUILDINGS.

PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

GENERAL OFFICE: Pittsburg, Pa. EASTERN OFFICE: 39-41 Cortlandt St., New York City.

WM. HENRY WHITE,

No. 32 Pine Street, - - - New York City.

ENGINEER AND CONTRACTOR FOR THE

ERECTION AND EXTENSION OF

GAS, WATER, AND ELECTRIC LIGHT WORKS.

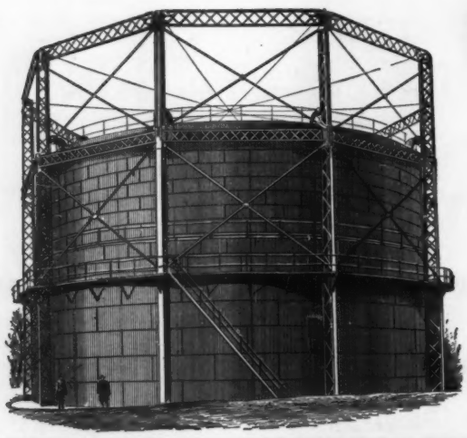
Correspondence with Gas Companies contemplating extending or improving their Plants respectfully invited.
Plans and Estimates Furnished.

1899 DIRECTORY 1899

OF AMERICAN GAS COMPANIES

Price - - - - - - - - $5.00.

A. M. CALLENDER & CO., - - No. 32 Pine Street, New York.



1842 ※ Deily & Fowler, ※ 1899

LAUREL IRON WORKS.

Office, No. 39 Laurel Street, Philadelphia, Pa.

BUILDERS OF

Gasholders

Single or Telescopic. With or Without Iron or Steel Tanks.

OIL TANKS, WATER TANKS, AND GENERAL WROUGHT IRON WORK.

JAMES R. FLOYD'S SONS,

Successors to HERRING & FLOYD,
Oregon Iron Works,

West 20th and 21st Streets, Between 10th & 11th Avenues, New York City.

Engineers and Contractors for the Construction of Gas Works.

MANUFACTURERS OF ALL KINDS OF CASTINGS AND GENERAL IRONWORK FOR GAS APPARATUS.

Bench Castings, Regenerative and Half Regenerative Furnace Castings, Condensers, Tower Scrubbers, Mechanical Scrubbers, Purifiers, Malleable Iron Retort Lids, Self-Sealing Retort Lids, Hydraulic Hoist Purifier Carriage, Crosses, Tees, Bends, Angles, Reducers, S-Bends, Sectional Sleeves, Plugs, Caps, Street Drips, etc., always on hand.

WOOD'S GAS SCRUBBING AND ENRICHING APPARATUS.

In use at Syracuse, Auburn, Watertown, Cortland and Geneva, N.Y.; Elizabeth, N. J.; Boston, Mass.; Jamaica Plain, Mass.; Providence, R. I.; Northern Liberties Gas Co., Phila.

Sole Manufacturers of the OGDEN QUICK-MOVING VALVE.

HEARNE CENTER SEAL, Operating One, Two, Three or Four Boxes.

Stroh & Osius Concentrator for Ammoniacal Liquor, used by 50 Gas Companies and Cokeries during the past 4 years.

The order for this Triple-Lift Holder and Steel Tank was received by the Logan Iron Works from the Union Gas Light Company, of East New York. The contract was completed and the Holder was in actual use in 90 days from receipt of order. Capacity of Holder, 500,000 Cu. Ft.

LOGAN IRON WORKS,

Brooklyn, N. Y.

MANUFACTURERS OF

Single or Multiple-Lift

GASHOLDERS,

Complete with Steel Tanks.

BENCHES, SCRUBBERS,
CONDENSERS,
PURIFIERS, IRON ROOFS,
Self-Sealing Retort Lids,
AND ALL PARTS OF
GAS WORKS APPARATUS.

Contractors for
Complete Works.

ALSO, SOLE MANUFACTURERS OF

C. W. BLODGET'S
HOT GAS SCRUBBER.

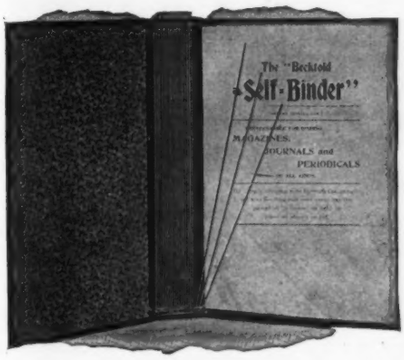
YOU CAN GET A PATENT

For any Invention. Send me particulars and a rough sketch for advice, free.

IMPORTANT to have your attorney at Washington, saving time and expense.

HENRY S. THORNBERRY, Patent Solicitor,
1427 F STREET, N. W., WASHINGTON, D. C.

BINDER for the JOURNAL.



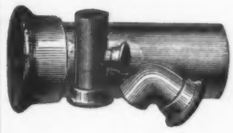
Price $1.00.

A. M. CALLENDER & CO., 32 Pine Street, N.Y.

WARREN FOUNDRY AND MACHINE CO.,

Established 1856. Works at Phillipsburgh, N. J.

New York Office, 160 Broadway.



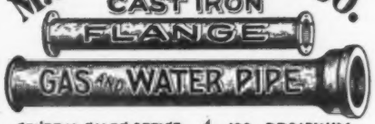
CAST IRON WATER AND GAS PIPE,

FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches. Bends, Retorts, etc., etc

"GLOBE" SPECIALS, VALVES, ETC. M. J. DRUMMOND & CO. "GLAMORGAN" FIRE HYDRANTS

MANUFACTURERS OF CAST IRON



GENERAL SALES OFFICE, 192 BROADWAY, NEW YORK.

Western Office: Monadnock Block, Chicago, Ills.

GEORGE ORMROD, Mangr. & Treas., Emaus, Pa.
JOHN DONALDSON, Prest., Betz Bldg., Phila., Pa

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA

MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

CHARLES MILLAR & SON, Selling Agents, Utica, N. Y.

Flanged Pipe and Fittings, Hydrants, Gates, Pig Lead, Jute, etc.

Manufacturers of Lead Pipe, Solder, etc., and Jobbers of Plumbers' and Tinners' Goods.

CAST IRON PIPE and SPECIALS FOR WATER AND GAS.

Wholesale Eastern Agents AKRON VITRIFIED SEWER PIPE.

Established 1854.

D. McDONALD & CO.,

MANUFACTURERS OF

WET AND DRY METERS, STATION METERS AND METER PROVERS.

—ALSO MAKERS OF

THE GLOVER PREPAYMENT METER.

The amount of gas delivered for the coin can be instantly and positively changed without removing the meter or replacing any parts.

The gas registered agrees absolutely with the amount purchased by the coin.

WE HAVE MADE AND SOLD IN THE UNITED STATES

OVER 30,000 OF THESE METERS,

ALL OF WHICH ARE GIVING PERFECT SATISFACTION.

Correspondence Solicited.

511 West Twenty-first Street, NEW YORK. | 51, 53 & 55 Lancaster Street, ALBANY, N. Y. | 34 & 36 West Monroe Street, CHICAGO.

NATHANIEL TUFTS METER CO.

ESTABLISHED 1849. No. 8 Medford Street, BOSTON, MASS.

Manfrs. of Consumers', Station, Test and Experimental Meters.

Sole New England Agents for the

PERFECT GAS RANGES.

In competitive tests it shows the greatest Efficiency, Durability, and Saving in Repairs.

Made in four grades, with Price and Size to suit any condition. We Guarantee every Range.

SEND FOR A SAMPLE AND MAKE YOUR OWN TESTS.

CHARLES E. DICKEY. JAMES B. SMALLWOOD. CHARLES H. DICKEY.

THE MARYLAND METER AND MANUFACTURING CO.

Established 1866.

BALTIMORE, North & Saratoga Sts. **CHICAGO, 107 West Monroe St.**
SAN FRANCISCO, 221 Front St.

CONSUMERS' & STATION METERS, PRESSURE GAUGES, Etc., Etc.

"Perfect" Gas Stoves

MORE OLD METERS

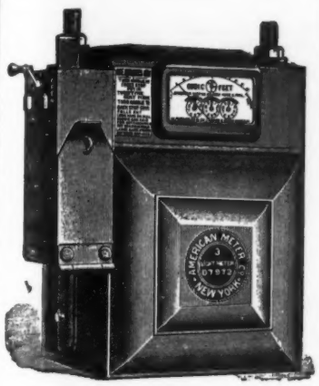
for Repairs have come to us this year than in the entire three years previous. . . . . .

WE HAVE A SEPARATE SHOP

for Repair work, receive Meters of all makes, and employ a large force of men. Return all moderate sized lots of one hundred or under, in Ten days to two weeks.

WORK GUARANTEED.

KEYSTONE METER CO.,
ROYERSFORD, PA.

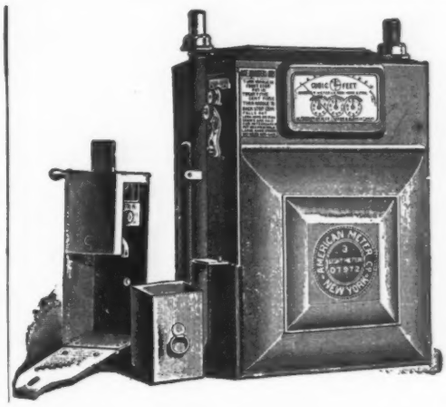


American Meter Co.

NEW YORK, PHILADELPHIA,
SAN FRANCISCO.

Prepayment Meters.

Their construction is such that they may be readily readjusted when the scale of gas rates is changed.



HELME & McILHENNY,

Established 1848. **1339 to 1349 Cherry Street, Philadelphia, Pa.**

MANUFACTURERS OF

Wet and Dry Gas Meters, Station Meters, Provers, Gauges, Etc.

METERS REPAIRED

PREPAYMENT GAS METERS.

Our Own Patents. Strong. Simple. PROMPT ATTENTION. CORRESPONDENCE SOLICITED.

METRIC METAL COMPANY,

MAKERS OF

GAS METERS for NATURAL and ARTIFICIAL GAS.

Special Attention given to Repairing METERS of all Makes.

FACTORY AT ERIE, PA.

THEODORE D. BUHL, President. CHAS. H. JACOBS, Secretary-Treasurer.

DETROIT METER COMPANY,

DETROIT, MICH.

MAKERS OF...

GAS METERS.

OUR equipment embraces the Latest and Most Improved Machinery. We make our own Tin Plate. We claim for "BUHL" METERS, **Increased Durability,** with probability of **Fewer and Less Expensive Repairs,** and **More Accurate Adjustment.** Comparisons invited. Meters of other Makers promptly Repaired.

MAIL ORDERS SOLICITED.

The Advertisement of

JOHN J. GRIFFIN & CO., Mfrs. of Gas Meters, etc.,

Nos. 1513, 1515, 1517, 1519 & 1521 Race Street, Philadelphia,

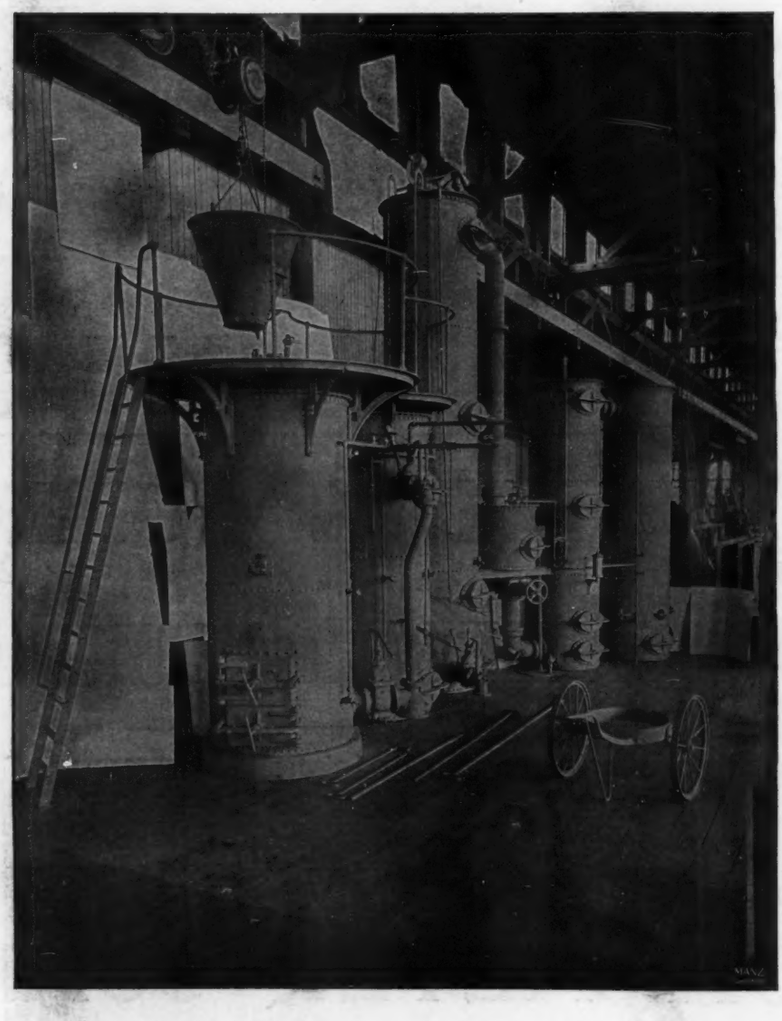
52 Dey Street, New York, 75 N. Clinton Street, Chicago,

Occupies this space every alternate week.

WHEN A GAS MAN KNOWS

THAT HIS

This is not special—it happens to all, only the others haven't the honor of appearing in the JOURNAL.



If you elsewhere see this style of AUTOMATIC FUEL CHARGING DEVICE;
If you elsewhere see this style of DOUBLE SUPER-HEATER PLATFORM APPARATUS;
REMEMBER, it has been COPIED BODILY FROM US.

IMPROVED LOWE WATER GAS APPARATUS

Is **completely put together** in our shop before shipment, being only dismantled sufficiently for transportation, **he has an assurance,** not otherwise possible, that when it is re-erected in his works **it will fit, and Look to Fit, and, most important, IS FIT.**

WILLIAM HENRY WHITE,
EASTERN ENGINEER,
32 Pine St., New York.

The Western Gas Construction Co.,
FORT WAYNE, INDIANA.